TAYSIDE

Potential for Development

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1970

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Preface

This study of Tayside, like the parallel studies of Humberside and Severnside in England and Wales, considers the problems and opportunities presented by the expectation that the population of Great Britain will be much larger by the end of the century. It also, however, assesses the potential of Tayside to contribute to the long-term redeployment of people and industry within Scotland.

The Secretary of State hopes that the study, which outlines a flexible programme rather than a rigid plan for development, will stimulate wide and informed discussion of the issues involved and lead to fruitful participation by the general public, by industry of all types and at all levels, and by the local authorities, in shaping the future of Tayside on a regional basis. The willing co-operation extended to Professor Campbell and Mr Lyddon throughout the area during the course of the study and the current joint publicity campaign by the local authorities in Tayside are good auguries for future co-operation.

The study breaks new ground in that it is the first major study of the kind to have been undertaken by a joint team from a University and a Government Department. The Secretary of State is glad to have had officials of the Scottish Development Department associated with Dundee University in this way. Publication of the study does not, however, imply any commitment by the Government to any of the views expressed or recommendations made.

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1 Introduction and Summary of Conclusions

1. We were appointed by the Secretary of State for Scotland to undertake an economic and physical planning study of the Tayside Region (Scottish Economic Planning Region No. 4). Tayside is one of the three parts of the UK – the others being Humberside and Severnside – which the Government decided to have studied in an examination of long-term population distribution needs. At the time it was estimated that the population of the UK would increase by about 17 million by the end of the century and that the increase in Scotland might be up to 1½ million.

2. The Tayside Study was also seen as a stage in the implementation of the White Paper 'The Scottish Economy – A Plan for Expansion' (Cmnd.2864 January 1966). The analysis of the region in the White Paper, when seen in relation to the needs of the Scottish economy as a whole, suggested that very considerable expansion of Dundee was possible and desirable. This potential was held to be important enough to give Tayside significance in a UK as well as a Scottish context.

3. The 1966 White Paper also set out, as it saw them, the major problems of, and opportunities offered by, the Region. Net outward migration particularly of the younger age groups, was substantial: the labour force was over-dependent on jute manufacture for employment and some smaller towns were showing signs of decline, with aging population structures and falling rates of natural increase. Dundee had proved its ability to attract industries of the kind most needed by Scotland and the White Paper claimed that if its population were to be increased 'it would begin to take on an altogether more powerfully metropolitan character, which would generate a greater and more self-sustaining range of employment and amenities'. The report stressed the considerable regional interdependence of the area and its potential for development as a modern city region. In addition it was felt that increasingly Dundee would form part of the complex of the Central Belt of Scotland: 'here is an opportunity to be seized both to achieve quickly part of the total Scotland growth target and to take a useful step towards solving regional difficulties'.

4. Part of the background to our general remit stated that while Dundee now has a fair-sized sector of fast-growing industries and is physically well adapted to expansion, expansion should not necessarily be confined to the City itself. Given the greatly improved communications afforded by the Tay Road Bridge and the dual carriageway road between Dundee and Perth; the need to develop the widest possible labour market in the City's hinterland; and the need to diversify employment in some of the Strathmore towns whose population structure is becoming distinctly unbalanced as a result of over-dependence on servicing a declining agricultural population, there is a good case for systematically developing the Tayside Region as a whole.

5. The scale of expansion desirable in Tayside by the end of the century could not be inferred from trends or needs within the Region itself. It had to be derived from the rate of national growth in employment and population, and from decisions about the share of such growth which should be deliberately stimulated and located in Tayside. The increase achievable by 2001 will depend to a great extent upon the growth of population in the UK as a whole and upon Scotland's share of it. But the importance of Tayside as the 'open end' of industrial Scotland suggested that the range for which it would be prudent to plan would be +175,000 to +300,000 population by the end of the century – the +300,000 being associated with a Scottish increase of up to 1½ million – and it was these figures we were given in our remit.

6. Our general remit may be summarised as follows. The purpose of the Tayside Study is to examine the economic preconditions and requirements for a population increase of between +175,000 and +300,000 by the end of the century, and to devise a flexible physical planning and investment programme which would allow a modern city region to develop without the constraints imposed by the congestion that is evident in existing conurbations.

The Work of the Study

7. We are satisfied that we have considered and appraised in a balanced way the complex inter-relationships that will govern the development of Tayside in the foreseeable future. We have tried throughout to look at the problems and potential of the Region comprehensively, and we emphasise that much detailed work in many areas remains to be done.

8. Our methods and procedures were influenced by:
   - (a) the size and characteristics of the Region,
   - (b) the degree of detail appropriate to a regional study,
   - (c) the time and resources available for completing the Study,
   - (d) the existence and availability of information, and
   - (e) the assumptions and goals, broad and narrow, that we adopted and/or considered in the early days of our work.

9. From the physical point of view, the size of the Region with its 2 million acres and its diverse characteristics have meant that surveys and analyses of equal depth and value could not be carried out for every part. A method was required that would allow the narrowing down of the area of search so that analyses in appropriate detail could be carried out in significant places. The

procedures we adopted for the physical analysis are described in Chapter 3.

10. In a regional strategy, the economic and physical policies are not required in the detail normally found in a statutory development plan. We adopted therefore a selective approach in order to ensure that the type and level of information to be analysed would be compatible with the proposals for the Region envisaged in the terms of reference.

11. The duration of the Study, and the resources available for the joint team were determined at the same time as the terms of reference. The work that could be undertaken had clearly to be tailored to these circumstances. We would, for instance, have found the results of the land use/transportation study of the Dundee area now being undertaken most valuable in the evolution of our proposals, but time did not permit this.

12. Our procedure has been one of narrowing down the wide range of possible solutions by successive testing against more exact criteria which, in turn, were based on more precise knowledge coming forward from our analyses of particular topics.

13. It will be apparent from the list of staff given in this report that several specialist professions have been engaged on the Study. This is a reflection of the scope and scale of the exercise, and also of the variety of the problems and prospects found in Tayside. Arrangements were made for the main full-time staff to share one office in Dundee throughout the Study period and this undoubtedly helped all of us to appreciate the considerations and constraints which determine the contribution that different specialists can make to a regional study. An outcome of this close collaboration is the production of a single comprehensive report, all of the chapters of which are the result of joint effort.

14. The report has not been presented in the form of survey, analysis and proposals. We have not found it desirable in practice to segregate the various stages and sections of the work into these compartments and in the report we have tried to show how fact, forecast and vision interacted in each aspect of the Study. The report is presented in three main sections. In Part I our methods, findings, and principal proposals are summarised. Part II contains more detailed analysis of specific topics. In Part III we summarise our investigations into existing settlements and communities, and set out our policies and proposals that should be considered for their future development and growth.

15. It should be appreciated that we are publishing only part of the information that has been collected about Tayside during the course of the Study. Each chapter contains some account of the principal sources from which information has been obtained and of the methods used in the analysis but much work is contained in technical background papers, statistical tables, and sketch maps which will be useful for subsequent detailed studies.

The Tay Valley Plan, 1950

16. An earlier report on the Tayside Region (boundaries similar to ours were taken in Angus and Perthshire but Fife was excluded) was published in 1950. This report concentrates on geographical and sociological aspects and does not contain any detailed study of economic trends. It considered that it was becoming desirable and possible to reverse the trend of depopulation of rural areas. It proposed that a development programme should be adopted to build up selected rural centres; to upgrade existing suitable smaller or medium-sized (5,000/20,000) towns; and to redevelop congested and obsolescent cities, the regional centres, which might 'involve a reduction in population to comply with new economic or social trends'. The report considered that the population of the Region would increase from some 390,000 to some 430,000 over 20–30 years. Half the increase was expected to occur naturally (assuming migration to be halted) while the other half was expected from spontaneous movement away from the Glasgow area.

17. The 1950 Plan's proposals for population targets, social policies and the redevelopment of Dundee have had little apparent effect. The total population in the smaller region remained virtually static between 1947 and 1966, and it has, contrary to the Plan's recommendations, tended to concentrate in the large towns and migrate from the smaller towns and rural areas. In particular, the population of Dundee has continued to rise. The Plan has had some influence upon the form of development plans, in particular on those for Perth and Arbroath.

18. The Plan contains useful survey material. Some of this, particularly that on historical background and architecture, was relevant to our work on individual communities, the results of which are in Part III of this report.

Consultations

19. The Scottish Office Steering Committee for the Study together with various Government Departments and public boards have assisted us by providing information about future investment programmes in Tayside and in commenting on, and discussing, our problems and ideas. We are grateful for their help and advice.

20. We have had throughout our work, the benefit of close cooperation with the Tayside Consultative Group. The Group, which forms part of Scotland's economic planning machinery, was constituted by the Secretary of State shortly before the start of the Tayside Study. The Consultants and/or their staff have been present at all meetings of the Group up to October 1969. We have greatly benefited from the discussions of the Group on general topics, and we have been helped particularly by the opportunities that were given to us to present questions and material for discussion and advice. On 17th October 1969, we presented to the Group a formal statement setting out the main views as they appeared to us, and the report that follows was finalised in the light of the discussion on that occasion.

21. We have been most grateful for the cooperation and assistance we have received from Councils and Local Planning Authorities in the Region, and from their officials. All Burgh and County Councils have been visited by the Consultants or their staff. These meetings provided opportunities for informal discussions of future prospects and appropriate policies; the discussions proved most helpful in formulating our proposals.

22. The Local Planning Authorities comprising the three County Councils of Angus, Perth and Fife, the City Corporation of Dundee, and the Burgh Councils of Perth, Arbroath and St Andrews, have been particularly helpful. We have received also much technical data on existing services and facilities, current commitments and intended future building programmes from the other burghs in the Region.

23. Information about county districts was obtained from the Census of Population and other official publications and also from the County Development Plans. The latter have been considered against the new requirements which expansion policies for Tayside will generate, and together with various supplementary reports by the Planning Authorities on tourism, traffic management, educational policies, etc., they have contributed much to the Study.

24. We are indebted also to the individuals and representative groups who responded to our invitation to present information and opinions on the development of Tayside, and to the trade, cultural and recreational groups who responded willingly to our specific enquiries. Particular thanks are due to the industrial and commercial firms who cooperated in the industrial survey which was undertaken in the course of the Study and to those who assisted us, in the Region and in Glenrothes, in our enquiry into mobility.

The Report and its main conclusions

25. We were asked to consider how the Tayside Region, with a present population of 450,000, could develop in the future with the possibility of the population reaching 750,000 by the end of the century. Within this brief, our main task has been to show how arrangements could be made for the future in response to a variety of changing circumstances, in a way that would provide living conditions in the Region appropriate to the year 2001. In addition, we have tried to show how those concerned should set about actually changing the existing conditions.

26. For such a task, a blueprint setting out the detailed physical, social and economic patterns to be adopted over the next 30 years did not seem to us to be appropriate or possible.

27. We have not, therefore, produced a definitive plan. Future changes and the pace of change are too uncertain for this, especially over so wide and varied a Region. What is required and what we have attempted is a document which explores and delimits the future possibilities and opportunities for development in the Region, which recommends some immediate action, and which provides a basic strategy that could be adopted as a framework within which detailed proposals may be discussed, modified, and selected for action.

28. We hope that our report will help both Central and Local Government, with all the communities and interests in the Region, to create those policies which will give the most effective use of available resources and the greatest satisfaction of people's wishes.

29. The report sets out the analysis and conclusions in full. In the following paragraphs we present our principal and supplementary conclusions.

PRINCIPAL CONCLUSIONS

1. The location and characteristics of the Region make it eminently suitable for a three-fold task:

The quality of the life and environment in the area should inspire further energetic redevelopment and improvement of the image of the Region.

The location of the Region in relation to the Industrial Central Belt of Scotland should allow it to contribute significantly to growth in the whole of the Scottish economy.

The space, character and location of the Region make it suitable for accommodating part of any long-term population increase in the United Kingdom.

2. We are satisfied that over the next 30 years Tayside could develop into a modern city region accommodating 300,000 extra people with high living standards and without congestion, while conserving and enhancing the high quality of environment.

3. The future development of the Region should be inspired by the aim of increasing and improving the opportunities for work, living and leisure. An increase in population would help to secure these wider opportunities for Tayside residents and for those moving from elsewhere.

4. We have found that the present physical and economic potential of the Region could be structured to provide a suitable springboard for its future development. A wide variety of residential, industrial, commercial and recreational sites is available.

5. We envisage a vigorous programme of rehabilitation and growth for the next 10 years. Nothing that we have found need inhibit the realisation of the proposed basic programme for physical redevelopment.

6. The continuation of existing policies would be unlikely to increase the demand for labour in the Region sufficiently to initiate the expansion envisaged in the remit.

7. To achieve the larger scheme of expansion in the next 30 years, capital investment in Tayside would have to be twice as high as a constant level of population would require.

8. Immediate joint action should be taken by the local authorities on a first phase programme without waiting for the reorganisation of local government. For this they should agree a joint programme of planning, land assembly and promotion, and use appropriate agencies.

SUPPLEMENTARY CONCLUSIONS

1. The Region extends to some 3,000 square miles and provides a cross-section of Scotland's geographical characteristics and a great diversity of towns, landscape and wild life. One quarter of the total area is lowland and has all the attributes for highly attractive residential areas. The greater part of this land is also flat enough to meet the needs of a variety of industries. All land with potential for development is within easy reach of recreation areas. [Chapter 8]

2. There are some 350,000 acres of high quality farmland which is among the most fertile and productive in Scotland, providing variety and versatility in farming types. There is a sizeable soft fruit and potato processing industry which has growth potential. [Chapter 9]

3. There is probably no other Region associated with an industrial potential which can provide a coast and hinterland containing such fine recreational possibilities. [Chapter 10]

4. The Region contains a population of about 450,000. Given the present demographic evidence, the population change by the end of the century could lie between +118,000 and −55,000. The whole range of remit growth is above the highest level of current probabilities. With low fertility, a population increase of 300,000 by the end of the century could be achieved by a net movement into the Region of 7,000 people each year between 1976 and 2001. [Chapter 11]

5. The maximum growth envisaged up to the end of the century could entail a two-fold increase in the non-manual population. It is likely that the quality of the physical environment and of cultural and other amenities will be of much greater importance in inducing non-manual workers to move in the future than at present, and particular attention needs to be given to the development of cultural amenities. [Chapter 12]

6. The success of a scheme for major population expansion depends on a substantial increase in manufacturing employment. In order to achieve the remit expansion by the end of the century the number of jobs in manufacturing industry might be expected to have to increase by some 55,000. The requirement for the first phase up to 1981 is estimated at some 10,000 additional manufacturing jobs and all, or the major part, of this would have to come from enterprises new to the Region. We conclude that special efforts will be needed to create work of sufficient volume and quality to halt net outward migration in the 1970s and to induce a net flow of people into Tayside and also that some special effort may be needed even in a no-growth situation. [Chapter 13]

7. Engineering and electrical goods manufacture is likely, in the course of the 1970s, to replace textiles as the Region's most important manufacturing group. Employment in the jute industry could be reduced by a third or a half in the next decade or so, and the brunt of the contraction could fall into the first half of that period. [Chapter 14]

8. It is probable that capacity of the construction industry will not act as a constraint on the rates of expansion in population and employment which may be envisaged for Tayside. **[Chapter 15]**

9. The existing pattern of the two major centres of Dundee and Perth with seven or eight other shopping and service centres offers an appropriate hierarchy for future city region development. **[Chapter 16]**

10. Three main components of future housing demand have been identified – 50,000 houses for replacing and improving sub-standard stock, 14,000 houses for new separate households, 107,000 houses for the larger remit increase in population. For the first phase 1971–1981 a total of 47,000 new dwellings would be required which would include a redevelopment programme of 20,000 houses. **[Chapter 17]**

11. Half the 50,000 houses required to replace houses becoming unfit etc. cannot be rebuilt on the original sites. Some 2,000 acres of new land will be required for these houses. The land required for industrial redevelopment could be 1,000 acres. The total land requirements for displacement in Tayside over the next 30 years amount to some 6,000 acres. This is a measure of the amount of new land that could be required for urban expansion even without any population increase. **[Chapter 18]**

12. Tayside has a good range of education and further education facilities. The latter are well distributed in relation to the existing population and to the potential industrial and service centres. The Universities of St Andrews and Dundee are expected at least to double in size to reach enrolments of 4,000 students each by the 1980s. Dundee may grow well beyond this figure. An increase of 300,000 people in the Region over the next 30 years would mean that at least 20 new secondary schools would be required. **[Chapter 19]**

13. It is inconsistent with the reality of a regional city to divide, as at present, responsibility for the hospital service in Tayside between two Boards. The timing, size and location of major hospital projects in Tayside will have to be reconsidered in the light of action on our proposals. **[Chapter 20]**

14. No particular difficulties or abnormal costs have been identified in providing engineering services to the areas of potential development. Water is particularly abundant in the Region and the identified capacity yield of 340 million gallons a day is not the long run upper limit. While many towns, which at present discharge untreated effluent, will need to install modern treatment plants, Tayside probably offers some advantage in the cost of drainage over many other regions because of the possible disposition of population in relation to its coast and estuary. **[Chapter 21]**

15. The present regional road system provides a comprehensive network throughout the Region. To cater for the proposed increase in population no major new routes are required. A phased improvement and upgrading of the existing network running in step with the increase in traffic is proposed. The construction of the M.90 motorway to Perth will provide an important initial impetus to the development of the Region. **[Chapter 22]**

16. The requirements for a Tayside transport system conducive to the scale of growth envisaged are identified. This system would include the maintenance of essential rail lines, the provision of an adequate freight liner service from Dundee and a direct passenger air service to London. **[Chapter 23]**

2 Appraisal

Introduction

1. Our remit requires us to prepare a plan for a large-scale development of Tayside over the long term. This has to take account of current trends and prospects and future needs and possibilities. We have to consider how the Region's problems may be overcome, and how its development could be phased and distributed. Thus, we have to examine the present character of the Region and the various long-term opportunities that it offers. The customary way of presenting predictions in planning reports of this sort is to prepare a Regional Plan for the target date which, in accordance with the remit, we have taken to be the year 2001.

2. A Plan of this kind is usually presented in the form of a more or less diagrammatic map which shows a recommended long-term distribution of different land uses, various target figures for population and employment, etc., in the places selected for expansion, and a network of major communications. Such a plan is useful as a coordinating framework in the early phases of a development programme, but it is not a definitive and final statement of policy and it should, of course, be reviewed periodically and adjusted to meet new conditions. While we submit a long-term map in Chapter 4 (Diagram 7) we regard it as only a description of certain possibilities and not as a blueprint nor as a comprehensive picture of all possibilities.

3. The map presents certain long-term proposals in a convenient summary form for display purposes but it is not perhaps the most important part of a planning report. The more fundamental consideration concerns the aims or objectives which lie behind the proposals, and the assumptions on which they are based. To set these out in simplified form may appear to be stating the obvious. But they need to be clearly stated and explained, for if the aims and assumptions are changed by the passage of time, it is more than likely that the proposals will need to be reviewed.

4. The supreme objective of the terms of reference, stated in Chapter 1, is the preparation of a flexible physical planning and investment programme that could lead to a really modern city region. In pursuit of this objective, and of the steady economic growth and improvement of the standard of living of the Region as a whole, we found it necessary to consider certain other important objectives and the means of achieving them. We give details of our approach in the Appendix to this Chapter but, briefly, we decided that a complex of five major objectives should form a background to our work. In defining these objectives, we acknowledge that there are possibilities of conflict between them, and that one or all of them cannot be pursued without limit. In terms, our use of the word 'maximum' must be interpreted as meaning 'the best possible in the circumstances'. Subject to these very important reservations, the five major objectives were: maximum choice and variety of housing; maximum choice and variety of employment opportunities; the maximum provision for commercial, social, cultural, and recreational activities; the maximum provision for communications, internal and external; and the best balance between exploitation and conservation of natural resources. In relation to each of these objectives we adopted what seemed to be the most realistic background assumptions. Reconciliation of the objectives was a continuing operation while we formulated our proposals, particularly in the physical sieving process described in Chapter 3.

5. In the present Chapter we give a general appraisal of the Region and the ways in which the terms of reference and our subsidiary objectives could be fulfilled. In the various sections, we summarise the present characteristics and problems of the Region, appraise the factors that have led to the proposed solutions, and present a provisional distribution of population.

A City Region

6. It was necessary to reach an understanding of the concept of a 'modern city region'. In particular, it was necessary to be clear how a city region should be defined in the context of Tayside and what was involved in keeping it up to date.

7. We consider a city region to be a region which is economically, physically and socially a unit. We see an analogy in the city itself where the dwellers in the suburbs regard themselves as part of the whole city and to a certain extent therefore we are dealing with an expanded city form. People living in a city region would normally do their day-to-day travelling — to work, to school, to shops and to some entertainment facilities — not very far from their homes; for more elaborate and specialist shops and for certain types of work they might travel farther afield; but the whole concept of a city region is that the vast majority of these journeys and activities would take place within the city region. On this basis a very wide range of living, working and recreational opportunities should be available and easily accessible within the city region.

8. In reality such an arrangement involves a complex system of interlocking relationships or series of sub-systems. For most activities there will be a multiple or hierarchical arrangement of catchment or market areas.[1] The various sizes of catchment areas for shopping, for example, can be set out in the form of a hierarchy of shopping centres. This would range from the community of 5,000 persons based on accessibility on foot, through the district shopping centre for 15–20,000 people up to

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[1] See, for example, the chapters on shopping (16) education (19) health (20) in Part II of this Report.

the regional centre for 100,000 persons and to the supra-regional centre for 500,000 or more people. For education, similar catchments can be defined.

9. The remit indicates a range of possible increases in the present level of population. We think that the larger proposed increase could be accommodated within the Region at high living standards; that it would be comfortably sufficient, on current estimates, for full city-region services to emerge; and that it would be consistent with the existence of a viable city region. We do not find it possible, however, to set a minimum size of total population below which a viable city region could not come into being. Whatever the actual minimum figure or range of uncertainty, it will vary according to how the population is distributed over the Region, to the degree of affluence, and to other, lesser things. For example, the higher the standard of affluence, the lower the population that would be required to create a viable city region. It would, however, be imprudent to plan on the basis that current estimates were wrong and that income would increase much more rapidly than is expected. We have regarded time as the variable factor and assumed, therefore, that Tayside's population will at some stage reach a level of 300,000 more than its present size — if not by 2001, then some time in the foreseeable future thereafter. The question of the timing of Tayside's population growth is, however, important to the compatibility of the development of a city-regional structure and the steps required to arrest, in good time, the symptoms of decline in some parts of the area. This is taken into account in our proposals for the phasing of development (Chapter 5).

10. It is within this general framework that we have examined the existing characteristics of Tayside as a city region and the future forms that could develop. There is more than one form, because even within an ideal set of hierarchies and activity catchment and market areas, many possible locational patterns could evolve.

11. The form that does emerge is an evolution from the existing pattern. Thus a summary of the existing characteristics of the Region is appropriate.

The Existing Pattern

12. Generally, the Region displays many of the essential characteristics we have already set out for a city region. It also displays a marked potential for the further development of these characteristics.

13. Tayside lies at the open north-eastern end of the industrial Central Belt of Scotland, and is well placed in relation to the further development and redevelopment of the central conurbations. Motorway and fast rail connections to both Glasgow and Edinburgh would reinforce this relationship and allow Tayside to become another city region in an expanded Central Belt.

14. Not only communications but topography suggest this (Diagram 3). The boundaries of the Region are open and indeterminate towards the Central Belt on the south, while all other boundaries are defined by hill or coast.

15. The area is well endowed with open space with a variety of urban communities and landscape. The total area is about 2 million acres and growth by 300,000 people would occupy 23,000 acres, 1% of the total land area or 3% of the land under 600 feet above sea level.

16. In Tayside as a whole there is heavy concentration of population into certain areas, 66% of the inhabitants living in the Perth-Dundee-Arbroath corridor. Out of the total Tayside population of some 452,000 in 1966, Dundee had 184,000, Perth 41,000 and Arbroath 21,000. About 10,000 people lived in each of Montrose, St Andrews and Forfar. There are five burghs (Brechin, Cupar, Crieff, Carnoustie, Blairgowrie) with populations of between 5,000 and 7,000, a further nine burghs with populations of over 2,000, and ten burghs smaller than this. Despite the concentration, about 25% of the population lives in settlements of 1,000 persons or less.[1]

17. It is evident from this distribution of population that there is already in Tayside a hierarchy of centres of the sort we suggest is to be expected of a city region. For the various kinds of services, we can see that seven or eight towns, and their supporting populations, are now of a size to provide the facilities appropriate to a district centre. Perth is a centre of a much higher order and Dundee could act as the supra-regional centre.

18. It is interesting to note, however, that at present Perth appears to provide proportionately more, and Dundee less, of the regional services than their relative populations suggest. This point is made in Chapter 12 (Sociological Background) and elaborated in Chapter XII of the British Association handbook *Dundee and District*.[2]

19. Our analysis of other major existing features of the Region also showed that they could be conducive to further city-region development. The existing road network is capable of phased expansion, there is outstanding recreational potential that can be utilised further, while sites for a wide range of housing and industry can be identified.

Problems of the Existing Pattern

20. We outline the current problems of the Tayside economy at two levels: first, those of the Region as a whole; and secondly, those affecting particular parts of the Region.[3]

21. The problems of the regional economy concern its rates of growth of employment and incomes; outward migration and the growth of population; the vulnerability of a substantial part of its employment base; and its employment prospects over the next decade.

22. Instead of growth, there has been contraction of employment in Tayside in the last two decades. Between 1951 and 1967, the number in employment fell by

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[1] See Table 5, Chapter 11 (Population).

[2] D.C.D. Pocock, 'Dundee and its Region' in *Dundee and District*, ed. S.J. Jones, British Association for the Advancement of Science, Dundee, 1968.

[3] See Chapters 13 (on employment) and 14 (on manufacturing industry)

10,000 to a level of about 175,000. While there were marked increases in employment in the engineering and electrical goods industries and in professional and scientific services, these were more than offset by widespread reductions in other industries, the most important contractions taking place in textiles, agriculture and transport and communications. As a result, Tayside's share of Great Britain's employment fell from 8.6 per 1,000 in 1951 to only 7.5 per 1,000 in 1967, employment falling by 0.4% a year in Tayside in contrast to its increase of 0.6% a year in Great Britain as a whole. The reduction in employment was concentrated on jobs for men.

23. Despite its successes about twenty years ago in attracting major new employers of labour, Tayside has not benefited from the arrival of any substantial new enterprises in recent years.

24. The average level of incomes from employment in Tayside is low relative to the average for the Central Belt of Scotland, possibly about 7% lower. And in approximate terms, the average level of personal incomes in Tayside lags behind that of the UK by about five years, and the lag has been tending to increase.

25. Contracting employment and the slow growth of income are conducive to unemployment and net migration. Yet unemployment on Tayside, at 2.5%, has been lower than the Scottish average of 3.4% in the period 1960–67, and lower than the rates recorded by most sub-regions in the Development Areas. Again while net outward migration has been substantial, averaging 2,500–3,000 persons a year from 1961 to 1968, it has been at a lower rate than in many parts of the Development Areas. Nevertheless migration has been large enough to offset the Region's natural increase and total population has remained more or less constant for many years. And, typically, more than 50% of the net loss in population was in the age groups 15–35 years, compared with only a quarter in the corresponding age groups of the 1961 Tayside population.

26. The economy of Tayside is heavily dependent on industries in which employment has been contracting and is certain to fall farther in the future. In 1967, agriculture and textiles (principally jute) provided 45% of Tayside's employment in the primary and manufacturing sectors compared with less than 20% for Scotland and 10–15% for Great Britain. Over the period 1951–67, employment fell by more than 5,000 in agriculture and by about 9,000 in textiles. Employment in agriculture is subject to secular decline, and further reductions in jobs are expected. The jute manufacturing industry will encounter sharply increasing competition from substitutes and further reductions in its protection against imports: substantial reductions in employment are, therefore, to be expected in employment in textiles in the years ahead.

27. In the light of these predicted contractions in employment in agriculture and textiles and given present trends and policies, total Tayside employment seems, at best, most likely to be at about the same level in 1981 as it was in 1967. Within manufacturing, increases in employment in certain sectors, predominantly in engineering and electrical goods, may rather more than offset the expected reductions in employment in textiles and other industries. We conclude that a more or less unchanged total demand for labour in 1981, as compared with 1967, would possibly be barely sufficient to keep unemployment and net migration down to the levels of the recent past. Moreover there would seem likely to be shortages of jobs for men which would worsen the general situation.

28. In general, the major Tayside economic problem is its slow growth, the main indicators of which are falling employment, sluggish growth of incomes from employment and relatively high net migration from key age groups. The Region has such a heavy weight of industries in which employment is contracting that its expanding sectors may contribute only just enough in the 1970s to offset job reductions elsewhere. Within this broad problem, a matter of particular concern is the forecast shortages of jobs for men. There is, however, a matter of even greater concern. We may have over-estimated the buoyancy of the electrical and engineering goods industries. We may have under-estimated the effects and misplaced the timing of the major changes in the jute industry; and we emphasise that any forecasting in that sector is, at the present time, most tentative and uncertain. In addition, it is clear that those who will lose jobs in one sector are not all necessarily suitable, even if training is available, for employment in particular expanding industries. There is therefore a possibility, which we would not dismiss lightly, that there could be a situation in the course of the 1970s in which unemployment in Tayside was much heavier and enduring than it has been in recent years. To avoid this conjuncture, so far as can be foreseen, more than the simple continuation of existing policies could well be required.

29. The problems vary in different parts of the Region. The reduction of employment in agriculture will affect the areas around Perth, Forfar, Cupar, Montrose and Blairgowrie. The vulnerability of the jute industry is directly important for many towns in the Region, but particularly for the Dundee area. Cupar will lose employment when the sugar beet factory closes in 1972. Perth and Arbroath depend appreciably on employment associated with the defence services, and reductions in such jobs are to be expected. The foregoing does not exhaust the list; but its extension would involve publishing assessments of the potential weakness of individual firms.

30. Some of the outer areas – notably the East Neuk and the Highland districts of Perthshire – depend heavily on tourism which provides only seasonal employment.

31. Our population studies have shown that in some areas, an example is Brechin, the population might decline in the long term, due to the existence of unfavourable age structures. These demographic difficulties are, however, associated with underlying employment problems.

32. The physical and social problems of the existing

pattern are centred in the main on the need to rejuvenate or redevelop the worn-out buildings in the Region and to improve its social and cultural attractions. In Dundee, in particular, considerable redevelopment of the existing housing stock is necessary in addition to what has already been undertaken.

Possible solutions

33. In this section we consider possible solutions to the problems inherent in the remit proposals and in the present situation in Tayside. We start by discussing the possible forms the city region could take, then examine the most promising methods of bringing industry and people to Tayside, and conclude the section by considering certain special influences operating in particular parts of the Region.

34. *Possible forms.* It should be emphasised at the outset that a preliminary physical analysis, on the first sieving technique described in Chapter 3, made it clear that the Region could easily absorb the proposed population increase. This left us with a variety of possible distributions of population within Tayside. It seemed appropriate therefore, to consider some provisional distributions of population, which broadly satisfied certain general criteria, and then allow these distributions to be modified as necessary by the more elaborate sieving described in Chapter 3 and the detailed analyses contained in Parts II and III.

35. There is a tendency when planning for a future increase in population to look only at the locations and conditions for the new population. We have tried to concern ourselves with the total situation at any one time, for even with 300,000 increase by the end of the century the indigenous population projected from 1966 will outnumber the new. Indeed even the term 'new' is somewhat misleading for of the 300,000 increase in population perhaps a proportion approaching a third would be born in the Region.

36. The meaning that we gave to the concept and our appraisal of the existing pattern made it possible to see that a form of city region already exists in Tayside. The basic question with which we were faced was therefore whether the future pattern could be based on, and could evolve from, the present situation; or whether over a period of time the present pattern could be progressively modified and an entirely fresh system and arrangement of activities could be contemplated. Our deliberations on this were particularly influenced by four considerations:—

(1) Early improvement in the existing situation in terms of redeveloping the existing urban fabric and arresting the symptoms of decline is required.

(2) Whatever the form chosen it should be as viable as possible in all aspects of city region life at any stage in its evolution.

(3) The pattern must be responsive to changes, many of which are unknown or difficult to predict at this stage, over at least the next thirty years.

(4) Any solution must pay respect to the aspirations and attributes of the existing communities.

37. In considering what pattern of development would best promote the growth of Tayside and lead to the most satisfactory living conditions, we observed initially that two extreme forms of city region could be envisaged. A relatively dispersed form could emerge from growth in the district and village catchment areas, while the larger towns and the city developed more slowly. The other extreme might involve a relatively concentrated form in which, for example, all growth would be located around Dundee or on a spine running through Perth, Dundee and Arbroath.

38. At each stage we have debated the various aspects of these extremes and variations on them in the knowledge that a possible solution would emerge from some combination between them. In addition we have observed the way in which each possible form could emerge from the present situation, whether it could be satisfactory at some mid-point of development and finally whether it could cater for a total population of 750,000 people or more in the Region. To some extent we have tried to seek an answer based on the fact that Tayside will be in competition with other areas in England and, more particularly, in Scotland and that therefore we should try to identify the conditions which will compete most favourably with other areas. Following this line of thought it appeared that if Tayside could become a dispersed city region it could offer a standard and a way of life which it could well be difficult to achieve elsewhere. There was evidence[1] to show that a considerable proportion of those coming into the Region in future could be returning to Scotland. All immigrants, but those returning in particular, could be seeking what they feel the Region has to offer in distinction from other areas. A wide range of urban choice in a rural setting could provide the distinction.

39. This range of choice could develop from the present situtation. The Region is particularly rich in small and large burghs. Great diversity of life and living conditions is evident in these communities and there is a substantial amount of under-used capacity not only in halls and public buildings but in many other facilities. It is possible to envisage each one of these communities developing in itself, thus contributing to rapid growth for the whole Region and providing considerable diversity and choice of living conditions.

40. Another way in which a dispersed form could develop might be a rapid growth of new communities away from existing settlements. The phased development of a series of new towns would have the advantage of locating building and promotional effort to form an entirely new environment in one place at a time. While this particular alternative would have all the well-known advantages of new town development it did not appear a particularly appropriate solution in relation to the wide range of existing communities and centres of activity.

41. The particular features of a form of development involving, in the extreme, a concentration of growth are perhaps more obvious. The possibility of a city growing in size to half a million people could be attractive not only to industrialists and commercial interests but to

[1] See Chapter 12 (Sociological Background).

many who wish to live within easy reach of the city lights. Such concentration, with rapid growth, would however be difficult to achieve without bringing about the congestion and the restricted living conditions, apart from other disadvantages, which our terms of reference asked us to avoid.

42. From the appraisal of the forms the city region could take, of which the foregoing is a summary of some of the major possibilities, we concluded that it would be more economical of resources to locate development initially in the most promising and dominant central area of the Region, and that this concentration of effort would have most chance of achieving the rate, or rates, of growth required. Beyond this we judged that growth would tend to spread to selected communities in the rest of the Region in the longer term. The faster-growing areas of the Region at present are in the strip from Arbroath to Perth and along the south bank of the Tay,[1] and it is in these areas that we believe that effort should be concentrated initially. It is expected that in the medium to long term the expansion of Dundee north of the Tay would encourage expansion of the central Strathmore towns and Arbroath and Montrose, and that the growth of Perth would stimulate growth in the western end of Strathmore.

43. Starting with the general conclusion that development should be concentrated initially in the central area of the Region, our examination of possible city region forms was based, in large part, on the definition of a city region as a complex system of activity catchment and market areas (paragraph 8 above). We note also that the development and effective functioning of a city region can be aided by the establishment of a hierarchy of centres. Our consideration here relies on assumptions concerning the mode of travel and the maximum acceptable journey times for different activities, coupled with information about the sizes of population necessary to support or justify the provision of certain services. These assumptions and information produce a hierarchical pattern of distribution of population.[2] Thus a population group of 5,000 people was taken to be the size, within fairly broad limits, that justified the provision of a two-stream primary school. Again a group of 5,000 was taken to be about the minimum necessary to support a local shopping centre. It followed that we should attempt to provide housing so that about 5,000 people are within easy reach of these two facilities. Similarly, and of much more significance for the distribution of population, criteria of acceptable travel times and market areas suggest that a population of about 15,000–20,000 people should have ready access to a secondary school and a district shopping centre. Moving up the ladder to services requiring larger populations to support them, people are generally willing to accept greater journey times, but some concentration of population around where they may be provided encourages such services to develop. Thus the services corresponding to a viable regional centre require a catchment of some 100,000 persons, of whom a substantial proportion should live in or near to the centre itself.

44. Labour markets are a most important part of the complex of catchment and market areas in the city region and must be one of the principal considerations in developing a suitable city region form. The Region exhibits, at the present time, a number of sub-regional labour markets, each with its own balance between employment and the supply of labour coming forward to match that employment, and some with net inflows of commuters and others with net outflows. For the future development of the Region's labour markets we assumed journey-to-work times that would be the maximum acceptable for most of the community; we knew the possible areas for new employment in manufacturing industry and we assumed that most potential employers, coming to new sites and industrial estates, would prefer to have access to larger rather than to smaller labour markets. Perhaps these, and other considerations of lesser importance, gave us more guidance about what not to do than what to do because there are many variables and unknowns and many choices of suitable areas for industrial development. However, the different possible patterns and timings of development were examined with these considerations in mind, and our proposed city region form was developed in this light.

45. The inter-relation between the regional level of demand, especially consumption expenditure, and the growth of the industry and services of the Region, was a further factor influencing our proposals. It was, perhaps, of more importance for the phasing of development than for its pattern. The rate of growth within a region will tend to be greater the higher the regional employment multiplier. Given that growth is required, advantage may be gained by creating circumstances in which a higher rather than a lower proportion of a region's own income is spent within the region (provided, of course, that the growth benefits exceed any detriments incurred by creating the appropriate set of circumstances rather than some other set). On this basis we sought to find locations for new and displaced population where it would tend to look mainly within Tayside for shopping, entertainment, etc. Similarly, while industry within Tayside must always remain heavily dependent on outside suppliers for inputs of materials and goods, there are possibilities of reducing leakages of business and industrial expenditure from the Region (see Chapter 14).

46. *Attracting industry and population.* It is of fundamental importance that jobs, of appropriate numbers and types, should be available if Tayside's population is to increase. Thus, for a population increase of 300,000, we estimate that the required increase in the number of manufacturing jobs in the Region will be about 56,000. In examining how to attract the necessary component of new industry, we looked at the conclusions reached by other bodies, and we also surveyed, formally and informally, the experiences and attitudes of firms at present engaged in manufacturing in Tayside.[3]

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[1] See Chapter 11 (Population).

[2] See especially Chapters 16 (on shopping) and 19 (on education) and the Appendix to this Chapter.

[3] See Chapter 14 (on manufacturing industry).

47. We have noted the general agreement of recent British and OECD studies[1] on certain conclusions:

(a) a region cannot expect to attract industry without adequate publicity of its attractions;

(b) substantial and guaranteed financial help from government is necessary to encourage industries to move to areas away from their normal manufacturing centres;

(c) the evidence suggests that a concentrated pattern of development is more attractive to most industrialists than a relatively dispersed pattern, though at the same time a high amenity environment is some attraction; and

(d) good communications are a pre-requisite of industrial development.

48. We found a fair measure of agreement with these conclusions among the firms in our survey. These firms named the following as the principal advantages of the Tayside Region: good labour relations (mentioned by 90% of the respondent firms); the pleasant environment (86%); Development Area status (67%); good road communications (45%); and good local authority co-operation (45%). The disadvantages of a Tayside location were stated to include its physical remoteness from other industries and from markets (71%), shortages of particular kinds of labour (59%) and its inadequate communications, especially air transport (49%).

49. The survey firms considered that by far the most important factor in choosing a factory site was the size of the available labour force. As far as locations within Tayside were concerned, most firms expressed a preference for the area in which they were established but, on a general basis, the Dundee area was held to be most attractive, with Perth, Arbroath and Forfar mentioned as other good possibilities.

50. Also vital to the success of any development plan for Tayside is whether the Region will attract, apart from employment, both management and labour. Again we sought to supplement our information by a special survey. From the survey and other evidence, both discussed in Chapter 12 (Sociological Background), we found that although the quality of environment is not at present a prime consideration in the mobility of labour, it is in certain age groups — particularly young married couples — and can be expected to be increasingly important in the future. It seems clear that the availability of different types of environment that Tayside could offer could be one of its potential attractions, and an argument therefore for development at a diversity of centres.

51. The quantity and quality of Tayside housing is clearly relevant to the attraction of people (and firms). The general aim is to provide housing in good areas with ready access to the industrial areas; in addition, a major task, at least in the next 10 years, is the redevelopment of substandard housing and other buildings in the Region. The full programme for replacement and new separate households, over the next 30 years, will amount to about 64,000 dwellings. The future development pattern will also have to take full account of these needs.

52. There is probably no other region with industrial potential which can provide finer recreational facilities.[2] Provided the opportunities demonstrated in our Report can be grasped, Tayside could be one of the few populous regions in Britain in which the provision of recreation can keep pace with future demand. This asset could be invaluable not only for persuading potential emigrants to stay in the area but also for encouraging inward migration.

53. The location and quality of shopping and service centres will be a major determinant of the character and standard of life in the Region. As has been foreshadowed in our discussion of the hierarchy of a city region, in paragraphs 43 and 44 above, our proposals involve building up the catchment areas for certain centres, so as to justify and stimulate improvement in the facilities that they offer. Thus, our proposed distribution of population, from the point of view of the shopping and service hierarchy, would be one which would give Dundee sufficient population in its catchment area to encourage and support its development as a supra-regional centre, and would give sufficient additional population to the Perth catchment area to confirm Perth as a regional centre but at a rate that should not impede the proposed development of Dundee. In addition to these principal centres, we envisage the confirmation and encouragement of a substantial number of good district centres.

54. The provision of an adequate communications system will be essential to the future city region. We have analysed the road system required by the proposed regional pattern (and also the requirements of certain other patterns) and found that the existing network could be improved and extended to cater for the traffic generated. Tayside is served by four main railway lines carrying both passengers and freight and by three minor lines carrying freight only. The four main lines have been designated by British Railways for long-term retention and development. We analyse the rail requirements of a city region in paragraphs 17–20 of Chapter 23 (Transport) and indicate our views on the future requirements of the proposed city region.

55. It is evident from the general arguments in this section so far, that we believe that the solution to our problems lies in the judicious combination of a policy of concentration with a certain amount of dispersal to give an adequate range of choices. The danger of traffic congestion, other than of a minor and temporary nature, can be avoided on the Tayside regional road system. Moreover our expectation of a wider dispersal of population as the city region evolves, as well as reducing the possibilities of traffic congestion, encourages us to think that the dangers and detriments of congestion in a wider sense and restricted living conditions are unlikely to present themselves.

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[1] Especially: *The (Hunt) Report on the Intermediate Areas*, HMSO, Cmnd .3998, 1969.
G. McCrone, *Regional Policy in Britain*, Allen and Unwin, 1969.
L. Klaassen, *Area Economic and Social Development*, OECD, 1965.
L. Klaassen, *Methods of Selecting Industries for Depressed Areas*, OECD, 1967.

[2] This point is elaborated in Chapter 10.

56. *Some special considerations.* There are some special influences and constraints operating in certain areas of Tayside in addition to those that have been indicated elsewhere. We have taken account of the following factors in examining different schemes of distributing population.

(a) Both Dundee and St Andrews have universities with considerable growth potential. Dundee University may grow to three or more times its present size, and St Andrews should at least double in size. Besides generating employment directly and indirectly, the universities will provide graduates for recruitment by local industry, a feature that may have some attractions for potential immigrant firms. We expect, also, that the existing links between the two Universities and local industry, especially in the sciences and engineering, will be strengthened; and we regard this probability as a favourable growth factor of importance.

(b) The growth of the University of St Andrews, and the direct and indirect increase in employment resulting from this, should go far to offer the town a potential population of about 20,000, the upper limit deemed desirable by its local authority representatives. We have taken the view, therefore, that any growth that we might envisage for St Andrews and its immediate area would be created as the University expanded.

(c) We considered that there should be no major development south of the Tay until after 1981. A first reason for this was that early major development south of the Tay would, almost certainly, have been at the expense of development north of the river in areas which must be seen to be prospering, or to be going to prosper, if the whole area is to realise its potential in a reasonable period of time. A second principal reason was not to run the risk of impeding the growth of Glenrothes to its planned size of about 70,000 which may be expected to be achieved by about the middle of the 1980s.

57. Our many discussions with representatives of the various local authorities, and with representatives of other organisations and individuals, have given us a picture of the aspirations of the existing communities, and of their attitudes towards growth. We have given full consideration to the views expressed, and have tried to frame proposals that respect the wishes expressed to us.

58. We have not, as we indicated in our many local meetings, tailored our suggestions to match existing administrative boundaries, partly because these boundaries are likely to change, but predominantly because we are in no doubt that development should be planned and implemented in terms of Tayside as a whole. In a similar way, we reinterpreted the green belt concept in order to suggest planning policies which will contain urban sprawl, identify directions of growth and define essential open spaces.

59. We considered carefully the case for, and the possibilities of, avoiding development on good agricultural land. We have taken the existence of high quality agricultural land as an important factor in the analysis, but not as an absolute constraint. Wherever possible we have proposed development away from good agricultural land, but we have been guided overall by the belief that, where development is proposed to take place on good land, any loss to agriculture will be more than compensated by the gain to Tayside as a whole.

A Provisional Distribution of Population

60. Our general appraisal of the Region and of the ways in which our terms of reference could be fulfilled brought us to a view of a provisional long-term distribution of population which broadly satisfied certain general criteria and portrayed a certain form of city region. In addition, we reached certain preliminary views about the phasing of growth.

61. *Phasing.* At this stage of our work, we thought that effort in the short term should be concentrated on the central core of the Region. This is the area in which the most urgent problems are to be found; it is important to improve its attractions, and the well-being of the regional centre is vital to the development and prosperity of the Region and any proposed city region. Beyond the short term, we thought that care might be necessary to prevent the growth of the centre, once successfully started, from proceeding to a stage at which virtually all important economic activity was highly concentrated and the rest of the Region, apart from its agriculture, consisted mainly of dormitory and tourist towns. We envisage, therefore, some realignment of effort to encourage a more dispersed pattern of development as population increases. We recognised, of course, that not all the immediate problems lay within the centre of the Region.

62. We thought it necessary to try to ensure that, starting with the present situation, a workable and enjoyable region or city region would emerge at each stage of growth. Thus progress in the early stages had to be consistent with whatever is necessary to repair the weaknesses in some parts of the existing structure. Again, we were disposed to reject any scheme that depended for its success and justification on substantial increases in population being achieved by specific dates. These considerations, and others already mentioned in this chapter, pointed towards a solution and a form that emerged from and built on the existing regional pattern.

63. Our *preliminary* views on phasing in relation to certain areas were as follows.

(a) Some growth in the *Dundee* and *Perth* areas should come early in the development.

(b) There might have to be some early effort at *Arbroath* to counteract a reduction in employment from the closure of HMS Condor.

(c) There should be a little growth early in the *Forfar* area to guard against possible reductions in manufacturing employment.

(d) Some early support for the *Montrose-Brechin* area might be justified given the Brechin situation.

(e) The pace of growth for *St Andrews* could be set by the expansion of the University and any developments in the tourist industry.

(f) Any development on the *south bank of the Tay*, other than residential development, should be

delayed until after 1981.

(g) Development in the *Blairgowrie* area should come relatively late, and after the growth of Perth was well established.

64. *Long-term distribution of population.* Our provisional long-term distribution of population, at this stage, is given in Table 2.1. The increase in population is taken to be 300,000 by the year 2001, this upper figure being used for the reasons given in paragraph 9 above. Estimates are also given of the associated increases in manufacturing jobs that might be required. These were rough estimates derived mainly by applying simple ratios to the population increases.

65. The provisional distribution for 2001 put about two thirds of the increase in population into the Dundee and Perth areas, a share slightly in excess of what they have at present. This was largely because it was thought that these would be the areas most likely to attract incoming manufacturers, and that it would be necessary to exploit their pull fairly fully in order to create conditions for growth in the other listed areas (with the exception of St Andrews). The attraction of concentrated development for most industrialists has already been noted. In the case of Dundee a substantial increase in its population, and the population of its immediate area, would be needed to ensure that it would provide the services appropriate to what we have described as a supra-regional centre. It should, perhaps, be emphasised that the increment was to go into the Dundee area, and not just into the City of Dundee. For example, significant proportions of the 360,000 people in the Dundee area were to be accommodated south of the Tay, and in the Carnoustie area.

66. In this provisional distribution, increments of population of 20,000–25,000 were proposed for the Arbroath, Forfar, Montrose and Blairgowrie areas. It was envisaged that growth in these areas would be likely to be slow until development in the Dundee and Perth areas was very well established. We envisaged these smaller areas expanding sufficiently to support strong district shopping centres and to provide reasonable supplies of labour so that, by and large, there would be created a number of sub-regional labour markets in each of which there could be a significant component of manufacturing employment.

67. The provisional pattern was seen as one that could evolve from the existing situation and its problems. It was thought that the creation of this particular distribution of strong district centres and sub-regional labour markets might be less expensive in its demands for road space than some other possible patterns. And it had the further merit of appearing to be in broad agreement with the views of many of those whom we had consulted and not too far out of line with the views of most of the others.

Reappraisal

68. We appreciated, when we drew it up, that this was unlikely to be the distribution that we would finally propose. The exploration of its defects and weaknesses, and the net advantages of other possible distributions, was the task that began when our first appraisal ended.

69. The provisional distribution of Table 2.1 was modified as necessary in the light of the constraints and standards discussed in Chapter 3, and the detailed analyses described in Parts II and III of this Report. The resultant long-term proposals are presented and explained in Chapter 4, and our proposals for the first phase of development, from 1971 to 1981, are given in Chapter 5.

TABLE 2.1 Provisional Distribution of Additional Population, 2001[1]

Place	*Existing population*	*Provisional increment of population*	*Total population 2001*	*Additional manufacturing jobs associated with increment*
Dundee area	215,000	145,000	360,000	28,000
Perth area	59,000	50,000	109,000	9,000
Arbroath area	25,000	20,000	45,000	4,000
Forfar-Kirriemuir	20,000	25,000	45,000	5,000
St Andrews	10,000	10,000	20,000	–
Montrose-Brechin	25,000	20,000	45,000	4,000
Blairgowrie-Alyth-Couper Angus	17,000	20,000	37,000	4,000
Other areas (unallocated)	79,000	10,000	89,000	2,000
Totals	450,000	300,000	750,000	55,000

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[1] This provisional distribution is Option 1 in Chapter 4 (Long Term Development Potential).

Appendix to Chapter 2

OBJECTIVES, ASSUMPTIONS, AND LOCATIONAL CRITERIA

A1. This Appendix summarises the main objectives, assumptions and criteria used in the Study. Many of them are simple and obvious, but we make no apology for this. Their presentation in this form will assist current examination of our proposals and their future review, especially if any of them change over time in a way that would affect what we have proposed.

A2. The summarised list is not comprehensive. We have included only items that warrant special mention. These assumptions and criteria, and others, are discussed as necessary in the relevant chapters of Part II of this Report.

Objectives and Basic Assumptions

A3. The supreme objective is the preparation of a programme for the development of a modern city region. We listed, in paragraph 4 of Chapter 2, five important subsidiary objectives. These objectives defined what we thought to be some of the main things that people would want in various sectors: housing; employment; commercial, social, cultural and recreation activities; communications; and the exploitation and conservation of natural resources. In what follows, we state our basic assumptions under each of these heads: the assumptions relate to the requirements of consumers or users, and to likely future trends in these requirements.

(1) Housing Assumptions

We have assumed that

(a) people will require dwellings in a broad variety of size, form, cost, and mode of tenure;

(b) separate households will increasingly require separate dwellings;

(c) people will look increasingly for greater amenity in housing in the form of

(i) bigger houses and

(ii) reduced housing densities; and

(d) most people displaced from redeveloped areas will want a new house relatively near to their old one.

(2) Employment Assumptions

We have assumed that

(a) people will look for jobs in the primary, manufacturing, construction and service sectors;

(b) people will want a wide range of employment opportunities, providing for the use of different abilities, skills and training in the four sectors in (a);

(c) people will generally try to live within easy reach of their place of work;

(d) industrialists will seek flat sites, with good accessibility and services;

(e) most industrialists will seek sites accessible to a large potential labour force;

(f) there will be some growth in female activity rates in the age groups 25–49;

(g) the share of employment in the services sector (excluding construction) would increase over time; and

(h) provision has to be made for replacing old industrial and commercial buildings.

(3) Assumptions concerning Commercial, Social, etc., Activities

We have assumed that

(a) increases in leisure time, incomes and mobility will stimulate demand for new facilities and the expansion of existing ones;

(b) a rising proportion of the population will look for advanced and part-time education;

(c) primary schools will continue to take the present age groups;

(d) secondary schools will be reorganised along co-educational and comprehensive lines;

(e) children will go to the nearest appropriate school to their homes, with certain stated exceptions;

(f) there will be increasing community use of school premises;

(g) associated with increases in leisure time and incomes, there will be a rapid increase in day and half-day car journeys, and in the demand for the facilities associated with such journeys; and

(h) people will want to have access, by foot, to certain types of shop and services.

(4) Communications Assumptions

We have assumed that

(a) movement will continue to be based on present forms of transport;

(b) people will want easy interchange between car, bus, rail, and air transport;

(c) car ownership and usage will increase broadly in line with national trends;

(d) a significant proportion of the population will continue to depend on public transport;

(e) there will be general increases in speed of travel and length and frequency of journeys; and

(f) while people will be willing to travel farther and more frequently for recreational purposes, they would not wish to have appreciably greater travelling times than at present for journeys to work, to shop, and to most social facilities.

(5) Natural Resources Assumptions

We have assumed that

(a) there will continue to be a premium on first-class agricultural land;

(b) consumption of water will continue to increase in line with national trends;

(c) sand and gravel will be extracted at increasing rates;

(d) requirements concerning the discharge of effluent into the sea and rivers will aim progressively at higher standards and be more effective in their achievement; and

(e) there will be an increasing appreciation of natural amenity and of areas of ecological and historical interest.

Locational Criteria

A4. On the basis of the objectives and assumptions we sought to devise some simple rules (largely locational criteria) to assist us to find the means, within Tayside, that would allow the objectives to be realised, and the assumptions satisfied, to the 'best possible extent in the circumstances' (see paragraph 4, Chapter 2). Some principal criteria are listed below. Other standards, etc., are indicated in other chapters and, in particular, in Chapter 3, 'Constraints and Standards'.

(1) Sites for housing areas should generally be under 500 feet above sea level, and on slopes between 1 in 10 and 1 in 40 gradients on north-facing areas and up to 1 in 5 on south-facing areas.

(2) New housing areas should lie outside the noise zones around existing or potential airfields.

(3) New urban areas and dispersed rural development should be placed so as to make the minimum intrusion into the rural landscape.

(4) Principal industrial areas should be located within 30 minutes journey by public transport of at least 30,000 persons.

(5) Urban communities should be within 30 minutes journey by public transport of at least two substantial employment centres.

(6) Provision for industrial land should be made, generously at a density of 25 workers per acre.

(7) Provided other objectives can be met, and provided that it is suitable or can be made suitable, development should be located where it can best utilise the social capital and infrastructural services of existing towns and villages.

(8) Employment in commercial and social services should be located in the various sizes of community in relation to size and the functions which can be appropriately located there.

(9) Regional services should be concentrated in Dundee and Perth, and the former should be developed as the principal (supra-regional) centre for Tayside.

(10) The basic urban area should be a community of about 5,000 persons living within a half-mile distance of daily shops, primary schools, doctor, district nurse, and a bus stop.

(11) Clusters of urban areas should be developed so as to provide, with the existing towns and villages, minimum groupings of 15,000 persons within 15 minutes journey by public transport of a secondary school, district shopping centre and health centre or district hospital.

(12) First-class agricultural land should be conserved so far as possible, but this must not be treated as an absolute constraint.

A5. It will be realised of course that these locational criteria were only basic working rules; and that they had to be broken, in the process of reconciling objectives, in the course of our detailed work.

Further Assumptions

A6. Certain important assumptions, of a rather different nature from the foregoing, may usefully be identified here.

(1) We assume broad continuation of existing government policies, *eg* with respect to development areas, agriculture, local authorities.

(2) We assume that personal incomes will increase broadly in line with national trends although specific assumptions are made, and stated, as required.

(3) Our assumptions regarding population, and migration in particular, are fully stated in Chapter 11 (on population) and need not be repeated here.

(4) Similarly our detailed housing assumptions concerning unfit houses, new separate households, vacancy rates and the increase in housing stock are given in Chapter 17 (Housing).

(5) We have taken no account of possible effects on the UK, and on Tayside, of entry by the UK into the EEC.

3 Constraints and Standards

1. Before describing in this chapter the process by which physical characteristics, constraints and standards were considered, it is appropriate to mention their relation to the general procedure used in evolving possible solutions. Three main strands to our work which were in operation concurrently may be distinguished as follows:

(i) The central strand was concerned with appraising the most appropriate city region form and long term development potential. This process consisted of the progressive selection from a range of alternatives in the light of joint deliberation based on the information gathered from the other two strands. Chapters 2 and 4 report on this work.

(ii) In the second strand there were continuing analyses of various subjects dealing, in particular, with social and economic aspects. The methods and surveys used in individual subjects are described in the chapters in Part II of this Study.

(iii) The third strand dealt with the analysis of the land and its potential for different forms of development in relation to space and environmental standards. The process of analysis at the regional level is the subject of this chapter, while the methods used in the area studies are described in Part III.

2. It was the constant interchange and iteration between the economic, physical and social investigations, that brought us to our main proposals and the regional form that we regard as most appropriate and which is described in Chapter 4.

Physical Analysis

3. The analysis of the physical characteristics of the Region was carried out in four stages, each successive stage going into greater detail:

(a) *Industrial Potential Survey* An assessment over the whole Region (scale of ¼" to 1 mile on a 10 kilometre framework) of the opportunities for industrial development and of the principal physical constraints.

(b) *Physical Capability Survey* An assessment in greater detail (scale 1" to 1 mile on a 1 kilometre framework) of the areas in the Region showing the greatest potential for future development.

(c) *Physical Factors* An analysis in detail (1" to 1 mile without framework) of the major groups of factors influencing population distribution.

(d) *Detailed Sieve Mapping* An analysis of particular locations (scale 2½" to 1 mile) in order to suggest the most appropriate form for future development in these areas.

Industrial Potential Survey

4. We mention in paragraph 9 of Chapter 1 that, owing to the size and diverse character of the Region, surveys in equal depth could not be carried out over the whole area. Some means of narrowing down the area of search was therefore required, so that analyses in appropriate detail could be undertaken in significant places. Accordingly the first task of the physical analysis was to seek out those parts of the Region which had the greatest potential for development. To do this a simple but systematic method was adopted in order to assess and to classify the whole Region, in the first place, in terms of suitability for industrial development from the physical point of view. The criteria that might be employed by developers contemplating the building of factories were thought to provide the best and simplest indications of overall development appropriate to a broad-scale study of an area of over 3,000 square miles. The method chosen was an adaptation of conventional sieve analysis in which we attempted to assess the potential of the various parts of the Region objectively by the use of a simple scoring method.

5. The exercise was carried out at a scale of 0.25 inch to 1 mile and the data were collected on a framework of 10 kilometre squares (about 40 square miles) based on the National Grid. On this basis Tayside is divided into 85 sections of equal area. Three broad physical criteria were adopted (climatic conditions, degree of slope, availability), three indicators of economic influence (employment, population, supporting services) and four communication factors (national road accessibility, regional road accessibility, railway freight services, railway passenger services). All these factors were given equal weighting in this first assessment. The possibilities of travel to work were allowed for by considering the nine squares centred on each individual square.

6. The results of the survey, shown in a simplified form in Diagram 4, indicate a clear division between highland and lowland areas. The 'physical factors' produce a complicated pattern. This is due, in part, to urban development being considered as a restriction on land availability whereas in the second drawing, 'economic factors', urban concentration is considered a favourable criterion. This second drawing also suggests two areas are particularly suitable for development, the first around Dundee, the second in mid-Fife (the latter reflecting the assumed spatial influence of Glenrothes, Kirkcaldy and Leven which are outside Tayside). The third drawing, 'communications', emphasises the weighting of the areas around Dundee and Perth and closest to Edinburgh and Glasgow and also the influence of the main road and rail links northwards to Inverness. The overall result obtained by combining all ten factors shows a concentric pattern radiating from the Dundee–Perth axis along the Tay estuary. In a more detailed map

prepared from this exercise the 'core' of the area is clearly defined as the part of Tayside which, on this basis, has the best prospects for major industrial development.

Physical Capability Survey

7. Having defined a 'core' in the Region in terms of industrial potential, we then proceeded to re-examine the Region in terms of potential for general development. This involved testing some hypothetical distributions and city region forms which would accommodate the remit population increase of 300,000 people. Diagrams 5 and 6 show these initial test distributions based on a preliminary physical appraisal and on the following themes:— (1) concentration around Dundee; (2) linear development; (3) circuit linear form; (4) proportional increase of existing settlements; (5) dispersed villages; (6) new towns. This investigation initiated consideration of the possible forms the city region could take as discussed in the previous chapter, and also confirmed that the significant areas of search for development purposes lay, in the main, in the core of the Region.

8. Following this the physical capability survey was conducted in two successive stages. The first stage was to examine the physical characteristics of the 'core' of the Region in greater detail in order to answer the following four basic questions:

1. Where would be the most pleasant places to live?
2. What areas enjoy most accessibility?
3. Which are the best areas for agriculture?
4. Where would be the best places for industry?

The method used was similar to that for the previous exercise, but in this case information was collected on a framework of 1 kilometre squares as defined by the National Grid, and at the larger scale of 1 inch to 1 mile.

9. The squares providing the most attractive areas for housing were selected on the basis of altitude, slopes, orientation, foundation conditions, landscape and degree of exposure. The most accessible areas were considered to be those adjoining existing major towns, beside main roads, close to operating railway passenger stations and close to the Perth and Dundee bridgeheads. The areas revealed using these criteria were also found to contain sufficient large flat sites with good foundation possibilities to make it unnecessary to carry out a separate search for industrial land. Finally the Department of Agriculture's classification of 'A' land was used to indicate the value of land for use in farming.

10. This exercise suggested that large areas were accessible and suitable for residential and industrial development. There were also extensive areas of good farmland, concentrated, first, along the north bank of the Firth extending from Perth, through the Carse of Gowrie to Dundee and Arbroath and along the coast as far as Montrose; secondly in Strathmore, and thirdly in the Howe of Fife. The areas of good farming land were, however, often found to coincide with the areas which were most accessible and most suitable for development, particularly along the estuary and coastal strip and around the major towns. The places where no conflict arose tended to be at a distance from existing settlements.

Physical Factors

11. The work of analysing capability was not, in itself, sufficient to resolve conflicts between possible land uses. Thus the second stage of the physical capability survey was to provide more precise basic information as a basis for decisions about alternative uses. Grid square analysis had been found to be a simple and appropriate method for the broad-scale analysis of large areas. The next stage was carried out at the same scale but independent of the grid and consisted of mapping in more detail the three major groups of factors influencing population distribution. These factors were, first, physical, showing land at gradients steeper than 1 in 5 or flatter than 1 in 40, over 500 feet, liable to flooding or with poor drainage; secondly, concerning their value for primary uses, showing sand and gravel deposits, existing quarries, brick and clay works, sand and gravel pits, existing woodland both in Forestry Commission and other ownership; thirdly, other factors, such as areas of ecological interest, airports and potential airport noise zones.

12. This second 1 inch scale appraisal of the 'core' showed, like the first, the plentiful supply of land potentially suitable for industrial and residential development. However, the core of the Region was shown to contain, in addition to its advantages for development, the areas of highest agricultural value and most attractive rural landscape. Both agriculture and landscape factors were considered as potential constraints to development. For the former, at the appropriate scale, the present productivity of farmland (Department of Agriculture classification and Land Utilisation Survey) and its potential (Macaulay Institute classification of Land Use Capability) were examined. The approach to the analysis of landscape factors and the effects of possible development is a more subjective matter which is discussed in the following paragraphs.

13. Within Tayside the lowland agricultural landscape is of a higher quality than almost anywhere else in Britain. However its appearance is, with some reservations, the ephemeral result of short-term management decisions together with the overall state of agriculture, the market for timber, and a multitude of other factors each of which is affected by more powerful influences than the preservation of landscape quality. It would not be quite true to say that this landscape quality is synonymous with good husbandry and high productivity, but the obverse certainly holds, namely, that the quality increases the farther the landscape is removed from a state of dereliction.

14. These observations concerning the links between the appearance and management of the agricultural landscape formed the background to the analysis of those landscape factors which should be regarded as constraints to development. In addition maps were drawn which identified areas where building development would least intrude into significant landscape views. These showed two types of ground which could contain development in this way. The first was in association with existing settlements where expansion up

TABLE 3.1 Land Use in New Towns in Great Britain

	Housing	*Industry*	*Open Space*	*Education*	*Other Uses*	*Total Urban Area*
Acres/000 pop.	26.9	5.3	11.0	4.6	7.2	55.0
% of urban area	48.9	9.6	19.9	8.4	13.2	100.0

to the limits set by the containing topography could occur unobtrusively. The second was in large areas of dead ground relatively invisible from main roads and customary viewpoints.

15. The possibilities and constraints revealed by these maps were used in the sieve analysis and were kept in mind in the detailed consideration of development alternatives.

Detailed Sieve Mapping

16. The final stage of the physical analysis work was carried out at a scale of 2½" to 1 mile. The purpose was to test in more detail the tentative locations which had been evolved from the physical and economic analysis. The assessment started with the areas suggested by the broad population distributions which tended to be immediately round the existing towns, and thereafter was extended to cover the whole of the core part of the Region. The methods and criteria used, together with a sample analysis diagram, are given in the introduction to Part III of this report. The conclusions reached are described in detail in the relevant sections on each community in Part III.

Land Use Standards

17. Rising standards in living and working conditions together with an increase in leisure activities are postulated through the plan period. It is relevant to this chapter to show how these assumed changes were translated into standards in order to provide the land demand figures for the physical assessments.

18. The changes are likely to give rise to demands for better environment, lower densities and improved facilities, all of which mean more urban land per head of population. The best illustration of this process is seen in the new towns although even there it is current needs which are being met rather than the possible demands of the 1980s and 1990s.

19. The typical land use structure of new towns is shown by Table 3.1 from Dr. R.H. Best's study *Land for New Towns* (1964).

20. Before these figures could be applied to the situation in Tayside the special needs of the Region in regard to housing and industry were considered. In the Scottish new towns the ratio of land used for housing per 1,000 persons is considerably lower than in England and Wales — 16.6 acres as against 29.0 acres. This reduced the average figure for housing in the above table to 26.9 acres per 1,000 population. On the assumption that development in Tayside must offer the same standards as competing parts of England, the allocation of land for housing has been set at 29.0 acres per 1,000 persons.

21. On the other hand industrial acreages have been higher in the Scottish new towns, at 6.1 acres per 1,000 persons, than in England and Wales where the figure is only 5.1 acres. Since growth in the Tayside Region will be largely dependent on the attraction of industry it will be necessary to reserve ample land for industrial development. The additional work force in manufacturing industry likely to be associated with a projected population increase of 300,000 was calculated (see Chapter 13). On the basis of an average density of 25 workers per acre the total land needs for new industry were estimated at about 2,300 acres, equivalent to 7.5 acres per 1,000 population. Although this figure is not quite as high as that used in Livingston, the fourth Scottish new town, it has been taken as a reasonable standard for the provision of industrial land on a broad regional basis.

22. The other major land uses, Open Space and Education, were also revised slightly to bring them into line with English and Welsh standards. The adjusted standards which we have used in the Study are shown in Table 3.2.

23. In addition to the urban space needs outlined above further provision may be required for such uses as market gardening, extractive industries, etc. These have to be borne in mind but it is difficult to make estimates on a *per capita* basis. We have adopted, therefore, a working figure of 60 acres of urban land per 1,000 persons in assessing the future urban land use needs in Tayside. The demands implied by the upper target population figure of +300,000 amount, therefore, to some 18,000 acres (72 sq.km.) or 28 square miles. In more graphic terms this could mean a strip of new development one mile wide from Perth to Arbroath, omitting the existing Dundee built-up area.

24. For design purposes during the early stages of our Study a basic unit of 1 sq.km. was used. This unit would provide for the needs of over 4,000 people although clearly the various land uses, particularly industry, would tend to be concentrated at particular locations in the area and not evenly distributed throughout each sq.km. In the later and more detailed stages of design and appraisal it was necessary to consider the main land uses separately. For housing it also became necessary to convert the net density figure in Table 3.2 to a

TABLE 3.2 Land Use Standards for Tayside

	Housing	*Industry*	*Open Space*	*Education*	*Other Uses*	*Total Urban Area*
Acres/000 persons	29.0	7.5	11.1	4.9	7.4	59.9
% of urban area	48.4	12.5	18.5	8.1	12.3	100.0

gross density figure so that the area of land allocated could be checked more readily. It was decided that a gross density of 25 persons per acre was a suitable figure for calculating the population capacity of individual areas.

25. This chapter has described the procedures used in the analysis of physical constraints and required space standards. As described at the beginning of the chapter, this work formed one of the strands of investigation, while another concerned the subject analyses, *eg* population, employment, recreation, roads, etc., which are reported in detail in Part II. Together they allowed the central theme of the evolution of proposals to proceed from the evaluation and appraisal described in Chapter 2, to the identification of those areas with development potential in the long term which are described in the next chapter.

4 Long-term Development Potential

1. Chapter 2 ended by setting out a possible distribution of population resulting from the appraisal and noted that this could be modified by the constraints and standards summarised in Chapter 3.

2. In this chapter we take the analysis farther and having summarised the major considerations concerning regional form, we show how the possible population distribution has been modified to give a preferred distribution. Based on this we go on to describe those areas which we think have the greatest potential for various forms of development in the long term. In particular we describe our conclusions concerning residential and industrial locations, agriculture, recreation and shopping, and the regional communication network. We suggest also how these could be translated into a regional land use policy for the area.

Regional Form

3. In Chapter 2 we considered the various forms the city region could take and the factors which could lead to concentration or dispersal of activities. Before describing the regional form that we regard as most appropriate and most likely to emerge if our policies are adopted, we summarise the factors which have had the greatest influence on our choice:

(a) The Region is well placed to become part of the restructuring and growth of the Central Belt of Scotland. The routes for fast motorway and rail connection to the Central Belt and to the rest of Scotland are already available. The major routes into and across the Region are thus already formed.

(b) The area under investigation is already acting as a region in the sense that the majority of inhabitants belong to and centre their activities in the Region. Hence no major reorientation of allegiances or concentration of activities is required.

(c) The demands on the Region over the next 30 years will be uncertain. The numbers of people who could be living in the Region by the end of the century covers a wide range. Any major increase of population, whether of 175,000 or 300,000 persons, will be a marked change from the existing situation and from foreseeable trends. In the face of the wide range of population possibilities, flexibility of policies and plans will be required. This suggests that substantial and specific advance commitment in new locations and forms of development would not be appropriate particularly in the early years.

(d) Whatever the population level at any particular time the existing and future indigenous population will continue to be an overwhelming majority. The existing communities and existing social groups, and their preferences, are bound therefore to form the basis of any future development and growth.

(e) The planning, programme, and action during the next 10 years are of the greatest importance. While it is important to give weight to the short-term proposals that are likely to be most successful in encouraging redevelopment and growth in the first 10 years, it must be recognised that action in the short run must accord with the preferred long-term regional form or forms and that different short-term programmes may offer, or preclude, different long-run options.

(f) In addition to the need for flexibility we have found that any new or dramatic preconceived city form would be inappropriate in itself. For example, we did not think that any linear city form or loop city with a barrage across the Tay, using new transport systems, was appropriate to consider at this stage. With so much already developed in the existing regional system a new start elsewhere would mean a discontinuity in building and social forms, and it would also involve concentration of resources on the new with a danger that the existing would be under-provided.

(g) For the same reasons we have rejected the idea of a new town for immediate implementation. The advantages of a new town are well known; but in the first 10 years a combination of effort with action in several places in the Region, and not a concentration of resources in one place, appears more appropriate. Most of those whom we consulted in the Region did not favour the development of a new town.

(h) Finally, the distribution of existing shopping and service centres, the road network, and the distribution of recreation facilities, all display a satisfactory basis for a future city region. Moreover rehabilitation, redevelopment and improvement of the existing facilities, rather than any remodelling of the total pattern, are required to serve the existing population.

4. From these factors we arrived at the interim conclusion that the future regional form should be based on, and developed from, the present form. Such a conclusion is however deceptive in its simplicity. The existing pattern may appear right for present circumstances, but this does not mean that it could be developed and redeveloped to take an increase in population and an increase in standards without congestion or other diseconomies. In particular the existing situation offers no guarantee of promotion potential or an ability to attract industry.

5. As will be apparent from Chapter 2 and the analyses in Part II, much of our work has been concerned with testing the various elements in the Region for their inherent development potential within an evolution of the present regional framework.

6. This work ratified our interim conclusion and led to

the proposal for a regional form based on improvement and growth of the existing framework with scope for flexibility. The major components of this are described in the following paragraphs

Distribution of Population

7. Broad distributions of population which matched the regional framework and which are considered in the economic, physical and community studies described in Parts II and III of this report, are shown in Table 4.1. In round terms these figures imply an increase of about 50 per cent in the population of the general Dundee area, and of about 100 per cent in each of the subregional community groups within the lowland area of Tayside. Given this build-up in the core of the Region, increases are also likely in the outer areas over the long term.

8. Option I repeats the possible distribution of population given in Chapter 2 and was the starting point for the detailed testing from which Options 2 and 3 emerged. Option 3 is the one we are putting forward as the preferred distribution.

9. The main difference between Options 1 and 2 lies in the distribution of population within the Dundee area. Option 1 divided the total additional population envisaged for this area in approximately even proportions between the four directions of growth to the south, east, west and north-west. Arising from the preliminary area studies greater potential was discovered on the east of Dundee. Option 2 therefore develops this potential with some 60 per cent of the growth in an easterly direction and omits any growth in the north-west. Differing amounts of population increase were also tested in other areas and in various locations in the vicinity of Perth.

10. When these two distributions were analysed and compared in the detailed studies of traffic movements, servicing, physical conditions, agricultural quality, phasing possibilities, etc. it was found necessary to make further adjustments. In particular the area studies produced information concerning the new land that would be required for rehousing as a result of redevelopment in each area, which is referred to in the next paragraphs The result of this final analysis is shown in Option 3, the main feature of which is a smaller total increase in the Dundee area in order to allow for the total demands for space. This preferred distribution is shown in Diagram 7 and is recommended in relation to the other proposals as appropriate for an increase of up to 300,000 people over the long term.

11. As mentioned, an essential part of the analysis which led to this preferred distribution for an increase in population, was a study of the land required to improve the living conditions and standards for the existing level of population (Chapter 18). We noted, for example, that between 1939 and 1966 the urban area of Dundee had expanded by 66 per cent while the population had increased by only 3 per cent. The process of renewal and redevelopment involves inevitably a 'thinning out' process with some people living at lower densities on the redeveloped sites and others from the same area needing houses in new residential areas. The general increase in living standards and space requirements of the next thirty years will increase the demand for land quite independently of any increase in population.

12. Development for new population has been assessed throughout the Region in conjunction with areas required for the relocation of people from existing communities. Table 4.2 (column b) shows the numbers of people who for each area, related to the existing level of population, may need to be relocated if the total population were to increase by some 300,000. Combining both the growth and relocation programmes, living places on ground at present undeveloped may be required for some 387,000 people.

13. The possible distribution of population may therefore be described in terms of where any increases are to go, and in relation to the redevelopment of the existing population. In addition the location of the possible total population by the end of the century is also of considerable significance in the resulting form and functioning of the city region (Table 4.2, Column d).

14. The areas that we have selected as having, on balance, the best long-term development potential for attracting and accommodating new or relocated population are shown in Diagram 7. For each area the possible increase in population, relocated population and the total population that might be accommodated by

TABLE 4.1 Alternative Long Term Distributions of Additional Population

Area	*Option 1*	*Option 2*	*Option 3* (preferred)
Dundee [1]	145,000	165,000	110,000
Perth	50,000	40,000	50,000
Arbroath	20,000	25,000	27,000
Forfar/Kirriemuir	25,000	35,000	35,000
St Andrews/Cupar	10,000	10,000	20,000
Montrose/Brechin	20,000	15,000	20,000
Blairgowrie/Alyth/Coupar Angus	20,000	10,000	20,000
'Core' Total	290,000	300,000	282,000
Highland & Rural	10,000	–	18,000
Tayside Total	300,000	300,000	300,000

1 includes Monifieth, Carnoustie, Invergowrie, Muirhead, Tayport, Newport, St Fort and Kilmany

TABLE 4.2 Possible Long Term Distribution of Population

Area	*Existing Population* *Total*	*Rehoused on new land*	*Additional Population*	*Total Population*	*Land Needs for* (b) + (c) acres
	(a)	(b)	(c)	(d)	(e)
Dundee	215,000	56,000	110,000	325,000	9,900
Perth	59,000	7,000	50,000	109,000	3,400
Arbroath	25,000	4,000	27,000	52,000	1,700
Forfer/Kirriemuir	20,000	3,000	35 000	55,000	2,200
St Andrews/Cupar	25,000	4,000	20,000	45,000	1,300
Montrose/Brechin	25,000	4,000	20,000	45,000	1,400
Blairgowrie/Alyth/Coupar Angus	17,000	2,000	20,000	37,000	1,300
'Core' Total	386,000	80,000	282,000	668,000	21,200
Highland & Rural	64,000	7,000	18,000	82,000	1,500
Total Tayside	450,000	87,000 [1]	300,000	750,000	22,700

[1] This figure is lower than that set out in the basic programme (Chapter 18) because of the anticipated differences in demographic structure, given a growth situation rather than a static level of population

the end of the century are described in paragraph 15. The diagram demonstrates this potential in two ways. Solid squares are used to represent 'new urban areas' each containing a population of approximately 5,000 with neighbouring facilities, open space and small industrial sites (see paragraph 23). The total population located in this way is about 327,000. Open squares suggest 'other urban developments' each representing a population of approximately 5,000 either in new separate localities or in additions to several existing small settlements. The locations indicated by the open squares relate, therefore, to the general areas in which they occur and not to their actual placement in the diagram. About 60,000 people are provided for in this way. As a result of increasing affluence these more dispersed opportunities could well be taken up and indeed in the longer term further such locations may have to be found in later reviews.

15. The areas selected as most appropriate are as follows

(i) In the Dundee area (defined in Table 4.1) an increase of approximately 110,000 persons is possible, while space for the relocation of 56,000 persons is also available. The possible distribution in the various parts of the Dundee area is shown in greater detail in Chapter 24. By the end of the century the greater Dundee area could have a population of 325,000.

(ii) In the Perth area an increase of approximately 50,000 people could be envisaged in conjunction with new sites for 7,000 people who might move out from the existing built-up area (Chapter 25). Taken together with the other developments around Perth this area could have a population of 109,000 at the end of the century.

(iii) In the Arbroath area an increase of around 27,000 people is envisaged together with sites for some further 4,000 people who might move out from the existing Burgh area. These developments could mean that by 2001 the Arbroath area could have a population of 52,000.

(iv) In the Forfar/Kirriemuir area, there could be an increase of around 35,000 people together with new sites for some 3,000 people who might be displaced from existing urban areas. A total population of some 55,000 could be accommodated by the end of the century.

(v) In the St Andrews/Cupar area an increase of approximately 20,000 people is envisaged as well as space for the relocation of some 4,000 persons. By the end of the century this area could have a population of 45,000.

(vi) In the Montrose/Brechin area there could be an increase of some 20,000 people as well as the demands generated by some 4,000 people displaced from existing urban areas. This could lead to a total of some 45,000 people in the area by the year 2001.

(vii) In the Blairgowrie/Coupar Angus/Alyth area an increase of some 20,000 people is envisaged and there could be a demand by about 2,000 persons displaced from the existing urban areas. By the end of the century some 37,000 people could be living in this area.

16. We have also considered the potential for development in relation to possible demands arising in the final decade of the century and beyond. In the event of a rapid and sustained increase in UK population major new settlement areas may be required at about the end of the century. In addition we have noted that a population increase of 300,000, given the build-up that we have assumed, would generate further substantial growth from natural increase. Hence we have thought it prudent, either for the last 50,000 of our remit increase or for the next 50,000 persons beyond that, to search for new areas which might accommodate further development of this order if required. These are shown in Diagram 7 as 'possible urban areas'. We have selected two areas as follows:

(i) *Montrose* This area, strategically located midway on the regional road between Dundee and Aberdeen, possesses the environmental advantages of the existing well-wooded park and, possibly, the potential development of the Montrose basin for recreational purposes

(ii) *Kilmany* A wooded and sheltered valley some four miles south-west of the Newport/Tayport area. This land is served by the

A.914 and thus has good access to Dundee *via* the Tay Road Bridge. In order not to overload the latter further industrial development south of the river would be necessary.

17. A further consideration is that ownership of second homes is at present very low in Britain in comparison with some other countries. Tayside, with its abundance of attractive areas and sites, could accommodate a share of the likely increase in the demand for second homes. We have felt it appropriate therefore to suggest two general areas suitable for this form of development.

(i) *Auchterarder/Crieff* The wooded river valley along the River Earn could provide excellent opportunities for residential and second home development. This area has ready access to the A.9 Glasgow–Perth road. (The general area of Auchterarder might also be considered in the very long run as a possible area for major new settlement.)

(ii) *Pitlochry* Development demands generated in part by an increase in numbers of people seeking second homes could well arise in the scenic Pitlochry/Dunkeld/Aberfeldy area. Provided that a sensitive and well-phased development plan could be formulated, these demands could be accommodated in a series of small settlements along the Tay and Tummel valleys.

18. The potential for residential and associated development that we have described may be seen in three broad locations, if the very long term possibilities mentioned in paragraph 17 are omitted. In the central location containing the Perth, Dundee and Arbroath areas, as defined, some 187,000 extra people could be accommodated, giving a total population of 486,000. In the Strathmore area, including Montrose, an increase of 75,000 persons would be possible, while in the part of Tayside Fife not included in the Dundee area, a further 20,000 could be envisaged. Increases of these orders in these three areas, when combined with an increase of 18,000 in the outer areas of the Region, give a total which matches our maximum remit increase of 300,000.

19. We considered whether the smaller remit increase of 175,000 people would lead to a different distribution of population. Since the regional form we envisage is based on a phased growth of the existing structure which should give a satisfactory regional form at any stage of growth, it follows that an increase of 175,000 can be regarded merely as one stage of growth. If growth were to be limited to about 175,000 fewer areas of development potential would be taken up and successive programmes of selection would be modified. The basic recommendations and conclusions concerning the distribution of population would remain unaltered.

20. A final comment is necessary on the population figures associated with particular areas in this section of the chapter. A precision which is not intended should be avoided in considering these figures. They have been set out in order to illustrate our policies and to show the weight of importance we attached to the different areas. In particular they could form the basis for initial discussions leading to an understanding of our first phase proposals (Chapter 5) and to modification and further selections for later phases.

Major Locations for Industry

21. The land required for industrial purposes of all types will arise from the accommodation of new jobs to replace jobs lost through industrial changes, and from growth in employment as an essential basis of the growth in population. For job replacement we have estimated that some 1,100 acres may be required (Chapter 18, paragraphs 9, 10) and for growth some 2,300 acres (Chapter 3).

22. This possible demand for 3,400 acres can be fully supplied in the general locations indicated in our community studies (Part III). Indeed our sieve analysis showed (Chapter 3) that flat land with good accessibility was one of the major assets of the Region. The sites we have selected are those which meet our locational criteria concerning proximity to homes, labour catchment areas, etc. To demonstrate the development potential in terms of industrial sites we considered three categories of industrial requirement.

23. The examination of individual communities (Part III) identified in some detail industrial sites which form part of the general urban expansion areas. The smaller of these sites, up to approximately 100 acres in size, we have regarded as part of those areas revealed for location of population (paragraph 14). They would be included in any town development or expansion, and together with existing industrial sites are not indicated specifically on our diagram of long-term potential (Diagram 7).

24. The next category covers larger sites from 100 up to 500 acres, which could be regarded as integrated industrial or trading estates and would tend to be somewhat removed from residential areas. Diagram 7 shows, by uncircled asterisks, general locations for 11 of these sites. They are shown in more detail on the community sketches (Part III) and mentioned in summary below:

(i) Dundee, West. This site is west of the Dundee built-up area and to the north of the A.85. Access to the site, which adjoins the industrial estate, would be from the dual carriageway A.972 *via* a primary distributor road.

(ii) Dundee, East. *a.* This site incorporates the Baldovie area which is zoned for industrial use on the current Development Plan. Our proposals include additional land to the east of the present site. Access could be provided from the B.978 which links the regional road (A.92) and a proposed city distributor along the line of the B.961.

(iii) Dundee, East. *b.* To the west of Newbigging and south of Cunmont Quarry there is a stretch of land visually screened from most of the existing and proposed residential areas. Industrial development could be served from the upgraded B.961 and readily linked to the A.92 regional road.

(iv) Dundee, East. *c.* North of Carnoustie there is potential for an industrial estate closely related to the proposed residential development. As mentioned in Chapter 24, advance shelter belt planting could be an important factor in the development of this area. Access to the industrial site would be from the A.92 regional road.

(v) Dundee, South. South of Newport there is an area with potential industrial sites running parallel to the Dundee-Edinburgh railway line between the A.914 and St Michael's Wood. Part of this area includes most of the gravel workings already operating alongside the Motray Water. Access could be provided from the A.914 which is programmed for upgrading to dual carriageway.

(vi) Perth. *a.* This riverside site immediately north of Perth is contained by the A.85, the A.9 and the River Almond. Part of the site is already zoned for industry on the Development Plan. Access to the regional road, the realigned A.9, could readily be provided.

(vii) Perth. *b.* There is an area of land between the A.9 and the Perth–Inverness railway line immediately north of Luncarty. This site could be developed as an industrial estate with access to the A.9 regional road.

(viii) Arbroath. Our studies indicated that the HMS Condor area north-west of Arbroath had significant potential as an industrial location. Use of this site for industry, or part of it, would however have to be justified as having priority over the land needs of the Ministry of Defence, and/or the benefits offered to Arbroath by its existing use. In addition to providing direct access on to the A.933 the site has the additional advantage of being serviced.

(ix) Forfar. The main site identified for industrial development is to the north of Forfar and to the east of the A.94 regional road. Access to the regional road could be provided readily.

(x) Montrose. On the land between the A.937 and the A.92 to the north of the town there is a site with considerable potential for industrial development.

(xi) Blairgowrie. South-east of Blairgowrie and south of the River Ericht is an extensive tract of land with good access to the A.923 which runs along the western side of the site. Farther south again, almost half way between Blairgowrie and Coupar Angus is another area with potential for industrial development.

The sites mentioned as available in the size category of 100–500 acres could amount to about 2,600 acres.

25. The third category of industrial site consists of areas of 500 acres up to 1,000 acres. These large sites will provide, for the years immediately ahead, a choice and variety of location for demands that might arise from very large-scale enterprises with special requirements. They will also provide a reserve of capacity for a long run in which the nature and quantity of the industrial demand for land is uncertain. We consider that provisions of this nature are an essential part of a regional strategy which has to be able to meet as yet unknown demands in appropriate places. In this third category therefore we have sought to extend the range provided by the two previous categories and to indicate possible sites which have some of the following characteristics:

(1) Capable of taking noxious industry, *ie* removed from main urban areas.
(2) Capable of meeting particular service requirements, *eg* cooling water, effluent disposal.
(3) Capable of expansion without being constrained by urban development.
(4) Particularly good access to regional routes
(5) Access to agricultural areas.
(6) Suitable for low labour-content processes.

26. Areas containing some or all of these characteristics where sites of 500 acres up to 1,000 acres might be possible are shown on Diagram 7 (encircled asterisks) in the following places:—

(1) To the north-east of Friockheim there is a possible major industrial site based on the disused airfield. This site could have a direct link to the regional road network and would be some 6 miles equidistant from Brechin, Montrose, Arbroath and Forfar. The agricultural quality of the land is B+ or less.

(2) On the coast to the north-east of Carnoustie a possible site exists at Easthaven. This is a major coastal site which we indicate as appropriate for industry (cf. paragraph 27 below). It should be reserved for industrial processes requiring cooling water and/or for an electricity generating station if required. The prevailing wind could drive airborne pollution out to sea but since there are many other wind directions frequently throughout the year a particular assessment should be made of this factor in relation to any industrial use. This part of the coast is not appropriate for major recreational uses and there already is an industrial plant sited at the north-east end of the area. Immediate access can be gained to the railway. The quality of the agricultural land is A class.

(3) We have shown a possible long-term industrial site based on Errol although we think that the site should not be considered for industrial use until it becomes quite clear that it will not be required for a regional airport. An airport would itself be an employment generator and there could be some small-scale associated industries.

(4) To the south of Coupar Angus there is a possible site which could be used for major food-processing establishments linked to agriculture. Direct links to the regional route could be obtained.

(5) Between Auchterarder and Dunning, there is a possible site that could be associated with the motorway and railway. The site is half way between Perth and Stirling, being some 11 miles from each town. The quality of the agricultural land is B+.

(6) At Ladybank in the south of the Region a possible site, near the main railway line, exists on land which appears to be neither A nor B+ in agricultural quality. Development of this site would have some influence on the regional economy to the south and any proposals here should be reviewed in relation to the Central Fife subregional planning strategy.

27. We have considered, in the Leuchars–Tentsmuir area, one further possible large-scale industrial site. From our other studies it was clear that industrial development in this area would help to reduce Road Bridge traffic generated by commuters living south of the Tay. Industrial development in this area would encounter various problems: there is flooding and a high water table; there are two National Nature Reserves and Tentsmuir Forest; and there are probably constraints given the continuing use of Leuchars as a military airport. However, we have noted that this site is under investigation, in a UK context, for development as a possible maritime industrial development area. Such a development would require some 5,000 acres of flat land as well as access to deep water. Massive investment would be required to meet the envisaged demands of any such development. Given the scale and general economy of Tayside this would be an extremely large project concentrated in a location south of the Tay. We have not regarded this project as appropriate to the regional development of Tayside in all the circumstances. If however it became a major proposition in terms of United Kingdom development then clearly the position would have to be reviewed.

Major Agricultural Zones

28. The major agricultural zones are already defined broadly by the existing high-class agricultural land which amounts to some 350,000 acres (A and B+ quality). The areas of development potential we have shown for an increase of 300,000 people would consume some 5 per cent of this land. We do not propose to embark on a discussion of the net advantages or disadvantages of using land for agriculture or industry or housing, etc. The actual quantities and qualities of land required for development are matters for more precise allocation and assembly at each programming stage. We show on Diagram 7 the major agricultural zones of the area.

Regional Communications

29. A vital part of the long-term development of the area will be the regional road and rail network and the connections to the other parts of the country. We have shown in Chapter 22 that the existing road network is capable of phased expansion and improvement which would enable it to keep in step with population expansion and growth, and would provide a fast road communication system within the Region. Diagram 7 demonstrates the main road network and shows those routes which should have dual carriageways by the end of the century. Road connections to other parts of the country, particularly to the south, are equally important. Completion of the M.90 motorway from the Forth Road Bridge to Perth will connect the Region to the UK motorway system and should provide a valuable initial impetus to development. With progressive improvement of the routes to Inverness and Aberdeen the Region will be well served by an inter-regional road system.

30. Within the Region and particularly within the Dundee area, the integration of an efficient public transport system will be essential. For all time certain sections of the community must rely on public transport and we see a continuing need for a comprehensive system of bus routes in the area. In providing for this our investigations show that our recommendations for siting new population in relation to existing centres and hence to existing bus routes will help towards a continuous programme of reinforcing these routes.

31. As explained in Chapter 23 an efficient rail system will remain important for the development of the Region. We regard the maintenance of the lines Perth–Dundee–Arbroath–Montrose, and, at the least, Ladybank–Cupar–Leuchars–Dundee as being the minimum internal lines for passenger services. Similarly for internal UK movements we judge it necessary to maintain the lines Edinburgh–Dundee–Aberdeen and Glasgow–Perth–Dundee, assuming that Perth–Inverness will be maintained in any case. The provision of an adequate freight-liner service we would also regard as a vital part of the transport system. While we do not envisage major developments at the port of Dundee, there should be ready access to the Forth and Clyde ports and to the container freight transport system.

32. On Diagram 7 we show possible airport sites at Errol and Leuchars. As noted in paragraph 26(3) we recommend that a site at Errol should appear in the strategy as a possible regional airport in the longer term. For the present, provision of a direct passenger air service from Leuchars to London with additional limited freight facilities seems to be the appropriate line of development.

Major Recreation Zones

33. The major recreation zones are seen as a vital part of the long-term promotion and enjoyment of the area. The full recreation resources and potential are demonstrated in Chapter 10. The major zones are illustrated on Diagram 7 as follows:

(1) In the East Neuk, general coastal recreational areas with particular possibilities of development at Largo and Shell Bays.

(2) At Buddon Ness, a major coastal recreational park with a combination of a wide range of facilities is physically possible.

(3) At Montrose and the area to the south, further recreational possibilities have been revealed particularly in the Montrose Basin where, with some restraint of tidal waters, a significant water sports area might be developed if costs were reasonably related to benefits.

(4) In the Pitlochry area tourist and recreation attractions are already sited. These could be developed further, not only in the valley but in the surrounding high ground.

(5) A general recreational area could also be developed in the Earn Valley although here a selection of facilities will be required and an appropriate balance must be struck between the demand and a supply which would preserve the existing landscape features.

There is a further area, Loch Tay, that we examined. Although this area is not shown on Diagram 7 we consider that there is significant potential for the development of water sports. Pressure for such development however will be closely related to the ability of the Earn Valley area to meet existing and future demands.

Shopping and Service Centres

34. As already described the regional form is based on a development of the existing physical structure. Not the least part of this is the present shopping and service pattern based on the existing centres of Dundee and Perth with some seven or eight existing district centres. Our analysis shows that the increase in population could be well served by further development of these centres. Existing spare capacities would initially be taken up and thereafter a careful phased redevelopment and increase in the various centres would be achieved to serve the existing and the new population. Particular policies however will be required to achieve the right balance between the various centres and these are detailed further in Chapter 16.

Social and Cultural Activities

35. We would stress that in the renewal or expansion of a town or region the existence of houses, shops, roads and factories is only a beginning. If the aim is to create conditions in which a vital society can be generated then a full range of social and cultural activities is essential. In the chapters in Part II we have dealt with the sociological background and those features such as health and education which are susceptible to some degree of analysis and quantification. Beyond this we would hope that some form of 'social plan' would be drawn up by all interested groups and bodies. This would attempt to set out the requirements and policies for a full range of social and cultural activities in the Region.

Total Land Demand

36. The primary concern of this chapter has been with the growth programme implied by the target increase of up to 300,000 population. However our studies have also shown (see Chapter 18) that even with nil net growth in population a substantial amount of development will be essential in Tayside over the next 30 years to meet the future needs of the present level of population. These basic needs are shown in Table 4.2.

37. Chapter 17 on housing needs showed the rate of redevelopment and improvement required in the existing housing areas, and the numbers of houses likely to be needed for new households arising from current demographic trends. In addition, job losses have to be offset by the creation of new jobs, and social and commercial establishments have to be rebuilt to meet changing needs. This represents a considerable programme of work which would be required quite apart from the needs generated by any additional population.

38. Estimates in Chapter 18 show the extent to which the basic programme will expand the urban areas. To provide for this at suitable environmental standards and at acceptable densities, will need large areas of new land outside the present built-up areas, and indeed outside the administrative boundaries of most of the towns in the Region.

39. Table 4.2 shows the approximate acreages of new land required in each part of the Region to meet all needs, including industry, arising from the maximum amount of growth stipulated in the Study remit, as well as the demand arising from growth in the number of separate households, and the estimated redevelopment programme. This table provides an indication of the amounts of land which might be required over the next 30 years in the development zones shown on Diagram 7. A similar table and map for the first-phase period (1971–1981) is included in Chapter 5.

Land Use Policies in General

40. Throughout our Study we have been concerned that our proposals should be as helpful as possible to the existing and future local authorities. One of the purposes therefore of demonstrating those areas which have a long-term potential for development is to suggest appropriate limits to the future changes in the way land is used. A planning policy which defines the possible changes is required in order to reach well-founded decisions at the right time.

41. There are, for example, areas which should never in any foreseeable circumstances depart from their present use; some coastal recreation areas or agricultural areas may be cases where all future changes should be directed towards enhancing the present use and character of the area. There are many other areas of all types for which the basic planning policy should be one of conservation.

42. In order, however, to promote a conservation policy for these areas, it is necessary to be able to meet elsewhere the development demands which might fall on these sites. These demands in the example of a recreation or agricultural area, could be for a hotel or a power station. Both may be vital for the Region but on balance inappropriate for the particular site. The only way in which to achieve a conservation policy in these circumstances is to have at the time of the demand arising, other sites elsewhere which would be more appropriate and which if used to satisfy the demand would not conflict with other major policy requirements.

43. It will never be possible to have land reserved for all likely uses in the right places at the right time. This is particularly true since the rate of development in the Region and the type of demand arising from unknown industrial changes are uncertain. Nevertheless, a regional strategy can suggest how planning authorities could give broad policy indications for the location of changes in the Region. The fact that there is adequate space in Tayside suggests that it should be feasible to ensure that all demands for land can be met, while at the same time ensuring that the land is used advantageously.

44. Following from this, our strategy could be taken further to suggest regional land use policies under three broad categories:

(1) Land where future changes should conserve and enhance the existing use.

(2) Land where change is appropriate for the defined purpose at the right time.

(3) Land where change is necessary.

45. We put forward these categories for consideration as the basis of planning policies in a 'County Structure Plan'. In the vicinity of existing and future urban areas however different categories of change in land use may be appropriate since growth in the form we are suggesting, that is by selected expansion of existing settlements, will involve a reappraisal of 'Green Belts'. The encircling containment of the belt would be broken by the phased development along the directions of growth. The resulting review of the Green Belt or containment could lead to a more positive set of policies than have been possible before. We would suggest that once the general directions of growth over the next 30 years have been agreed, it will be possible to specify more clearly than before the type of development which should occur in the vicinity of the existing built-up areas. Hence a new Green Belt policy would, in the context of Tayside, be dealing with green spaces rather than belts, and would deal with the following types of space or zone:

(1) *Country Zone:* containing land outside the existing built-up areas and outside future growth zones. This would remain as countryside for as long as the plan foresees, and principles governing the type of changes which could occur in these country zones could be drawn up and should be readily understood. The most important part of the zone would be its edge or boundary with the urban area and the principles would have to pay particular attention to each local circumstance of urban/rural interaction, in order to avoid erosion between the two.

(2) *Growth Zone:* This may be a convenient label to give the land generally falling within the directions of growth that are agreed. Here the proposal is for development, at some time, if required; the principles or policies for development would set out the programme for development within the zone. On the one hand, sporadic development throughout the whole zone must be avoided (and zones of deferred development may be a possibility); on the other, a choice of sites for development must be provided at each stage of development. The location and direction of these growth zones are dealt with in Part III.

(3) *Greenscape:* Within each growth zone there will be areas which should be regarded as an integral part of the urban development since they should provide a green landscape and recreational open spaces close to the residential areas. These spaces we have labelled 'greenscape' (Part III). They will come under pressure from expanding development and policies defining the range of functions which the land could fulfil will be necessary. In most cases we would suggest the greenscape should be used predominantly for recreation and woodland. Some horticulture in the form of nursery or market gardening could also be appropriate.

Concluding Remarks

46. We hope that the long-term development potential which we have demonstrated in this chapter will help in formulating the planning policies and programmed selection of land in the Region. We have used this long-term view to guide the selection of the short-term areas for development suggested in the following chapter (Chapter 5). It is essential that this process of review and selection should be a continuing operation. As demand becomes known so future development programmes can be assembled and the opportunities we have revealed can be reassessed and, if appropriate, taken up.

47. For this process, or indeed this Report, to be fully understood, continuous reassessment is essential. Only by discussion, cooperation, and combination on the planning, programming and production effort, can the opportunities be properly appreciated, be changed into a programme and finally realised in the shape of high-quality living places within a vital region.

5 First Phase Development Potential

1. While the primary purpose of our Report concerns the potential of the Region over the long term, we have been concerned also with immediate prospects and needs. Changes are already taking place in the Region which require coordination. Equally important, there are other changes which must occur in the next ten years if the Region is to maintain, let alone improve, its economic and social viability, whatever the long-term may bring in the way of growth.

2. We cannot stress too strongly the dangers of doing nothing. Despite the considerable amount already achieved, both in terms of the urban fabric and the industrial structure, the present position is still one of erosion. The aging of buildings, the impact of the car and the contraction of certain industries are all problems which require further attention and a coordinated effort.

3. We find it convenient to formalise our treatment of the changes already occurring and those that, in our view, must take place within a *basic programme* of restructuring and rejuvenation. A *programme for growth* would have to be superimposed on the basic programme which, in itself, would be an essential part of the growth programme. The possibility of a commitment to growth, envisaged in our remit, has led us to shape the basic programme in the way that seemed most helpful to the inception of growth. This chapter deals with our proposals for restructuring, rejuvenation and growth for the first ten years (1971–1981).

4. With the general aim of leaving the choices among different development opportunities open as long as possible, we propose that development in this first phase should take place in those places which are common to all the long-term possibilities. This still leaves a considerable choice of areas which could be developed in the early period. For one object of the regional strategy is to encourage rather than to restrict local initiative and although we indicate certain areas as being the most likely locations for development in the 1970s, we do not rule out many other potential locations which are included in the long-term proposals. It will be for planning authorities to translate the regional strategy into development plans and to define the 10-year programme within their structure plans. More detailed local plans will then analyse such items as relative costs, land acquisition and environmental design, and will determine which sites actually are developed.

5. The regional strategy, when fully agreed, must however provide for the local authorities the overall targets or range of possibilities for the first ten years. Our suggestions for the first phase should help in the formulation of these targets.

6. What we have referred to as the basic programme is we feel essential to the future wellbeing of the Region and we would hope that, following discussion, there can be a commitment to this programme by all concerned.

7. The growth programme goes beyond the basic programme and involves different considerations. The fundamental questions are whether we propose growth or not and, if so, how much growth by 1981. A range of possible growth and non-growth situations is shown in Table 11.6(a) of the chapter on population. If there is to be ordered and efficient achievement, as we see it, of the remit expansion proposals Tayside population will have to increase by something between 33,000 and 56,000 people between 1966 and 1981. On the other hand, continuation of existing trends suggests that, over the same period, Tayside population will change by something between an increase of 26,000 persons and a reduction of 19,000 persons.

8. We have seen it clearly as not our business to recommend any particular growth target or to recommend that specific commitments for growth should be undertaken. This would have taken us into matters of policy, moreover any such attempt would have led to investigations of comparative costs and benefits which lay far beyond our resources. Thus, despite the discussion in the immediately following paragraphs, we decided that, whatever else we might say, our preferred programme for the years 1971–81 must be consistent with the possibility of achieving population growth in the range 175,000 to 300,000 by 2001.

9. There are three grounds for arguing that we should put forward lesser schemes than those with growth in the range of 33,000 to 56,000 additional population in 1981. They involve the revised population projections for the UK; the suggestion that growth of even 33,000 would be too difficult and too costly; and the proposal that, in the first phase, it would be best to direct all available energies and resources towards a basic programme of restructuring and rejuvenation as a springboard for a growth programme.

10. First, the population projections for the UK at the end of the century have been revised downwards since the Humberside, Tayside and Severnside studies were inaugurated, so that lesser proposals may now be appropriate. Apart from the fact that long-term population forecasts are notoriously unreliable, there is still to be very substantial growth in the UK population between the 1960s and the 1990s. However the decisive consideration here was neither of these things: it was, simply, that what share, if any, of population growth in Scotland and the UK, whatever size it might prove to be, should come to Tayside was not a matter to be resolved by us.

11. Secondly, given our assessment of the difficulties and costs of stimulating growth in Tayside, indicated in the appraisal and employment chapters (Chapters 2 and 13) and elsewhere, it could be argued that any growth considered for the period up to 1981 should be more modest than an increase of 33,000 in population. Had we believed that no growth, or only negligible growth, would be possible except at quite unreasonable cost, it would have been proper to say so. But that is not our belief, though we do not under-estimate the difficulties that will have to be overcome to change past trends. It is worth emphasising that the larger growth target of 56,000 increase in population over the next ten years may seem an impossibly abrupt change from the losses of the previous ten years. But net migration between 1961 and 1968 was made up of 14,000 people coming into the Region and 17,000 leaving it each year. Thus a growth programme of as much as an increase of 5–6,000 persons a year could be achieved by stemming the current exodus by a half while maintaining the inflow. Again, our investigation of the construction industry, shows that a rate of increase in its work, consistent with the achievement of an increase in population of 56,000 by 1981, could be accommodated, probably by the potential already in the Region. In addition, the optimism shown by manufacturers in the electrical and engineering industries and the recent successes of Glenrothes in establishing a fast-growing manufacturing sector, should be noted. Quite apart from the requirements of our remit, these are some of the considerations that have made it seem justifiable to draw up proposals for what might appear to be optimistic growth for the short term.

12. A third suggestion is that only very minor growth in the first phase would allow all energies and resources to be directed towards renewing the fabric and refurbishing the image of the Region. Thereafter the Region would be well equipped to carry forward the growth and redeployment of population. We found the distinction between re-equipment and growth somewhat elusive in certain sectors but, more important, we found advantages in combining growth and rehabilitation. Even to stand still in terms of population, and certainly to improve its real income, Tayside needs jobs from new enterprises; these are more likely to be attracted by reasonable population growth than by a policy of stability of population. Moreover, we viewed with some doubt the cost-effectiveness of a substantial rehabilitation programme for social capital that was intended in part, but not for some years, to support population growth. Again, from the point of view of our remit, minor growth by 1981 would have made it expensive and difficult to achieve in the 1980s and 1990s the increases envisaged for the end of the century if they were required.

13. Summarising therefore we concluded that our first phase proposals must be consistent with achievement of the remit proposals, and we saw advantages in setting out what may be regarded, by some, as optimistic proposals. We thought it desirable, however, to explain in the immediately preceding paragraphs, other possibilities and suggestions. Our proposals for the 1971–81 programme are suggestions based on:

(1) An essential and basic programme of renewal, replacement and improvement to which some commitment by all concerned for a continuous building and promotion programme should be made.

(2) A growth programme, based on phased implementation of the remit population increase, which might be achieved given the appropriate share of the growth and redeployment of population and employment that it might steer to Tayside.

THE BASIC PROGRAMME

14. One of the priority aims in the first phase should be to improve the 'image' of Tayside in the minds of the emigrants who leave the Region, the visitors who pass through it, and the people and firms in other parts of the country who might consider moving in. This is a complex and lengthy undertaking, but two main elements are the improvement of housing conditions and ancillary services, and the adequate provision of employment for men and women. In both these respects action is required throughout the Region in the period up to 1981.

Housing Needs

15. The estimates in Chapter 17 (Housing) suggest that some 20,000 dwellings may need to be replaced within Tayside in the period 1971–81, and that a further 7,000 new dwellings will be needed to accommodate the increase in the number of households arising from current demographic trends. In total, therefore, about 27,000 new dwellings are likely to be required in Tayside between 1971 and 1981 even without any planned increase in the population. Table 5.2 shows how this demand arises from the various areas. Table 5.1 column (a) expresses this demand in terms of population, part of which (column (b)) cannot be rehoused within the present built-up area.

16. All the towns in the Region have basic housing needs of this kind, but Dundee faces the biggest problems, both in regard to the amount of redevelopment and the amount of displacement on to new land. The estimates in these respects for the Dundee area are summarised in Table 5.2 of this chapter, together with estimates for certain other towns and the area as a whole.

17. To meet this basic housing programme a considerable area of new land will be required outside the present built-up areas. This is allowed for in the areas indicated for development in Diagram 8.

Employment Needs

18. Although Tayside has an appreciable amount of employment in fast-growing sectors of the economy, notably in engineering and electrical goods, the total of employment fell by about 10,000 between 1951 and 1967, employment in the latter year being about 175,000 (see Chapter 13 on employment). The principal sources of decline are agriculture, textiles (mainly jute manufacturing) and transport and communications. Further contraction of employment is likely to take place in these sectors in the course of the 1970s, employment in jute being particularly vulnerable.

19. During the period 1967–81, therefore, the aggregate of the net losses of jobs for contracting Industrial Orders is estimated at 16,000, about 9,000 of them in manufacturing. These are the job losses that have to be replaced to maintain the 1967 level of employment. In addition 5,000 jobs would have to be found to accommodate a small increase in the number of employees, even with a constant level of population, and to allow for some reduction in the rate of unemployment. Thus the total requirement for new jobs (excluding the new jobs produced in the contracting orders and already counted) would be about 21,000. About 18,000 of these might be expected to be provided by expanding Industrial Orders, especially engineering and electrical goods and some of the services industries.

20. While the net requirement of new jobs for a non-growth basic programme is estimated at 3,000 or so, this is too simple a description of the problem. A sizeable number of those made redundant will not be able, even if training is available, to find suitable jobs in the expanding sectors. There could be some lack of male jobs, and a rather larger deficiency for women, within the small overall shortage of jobs forecast for 1981. Whether the forecast would be realised depends largely on whether some mildly optimistic expectations are realised. A further factor is the Region's low average of income from employment. It is clear that even without growth, and on the basis of existing trends and policies, further efforts will be needed to contain net outward migration and to keep unemployment down to the levels of the recent past.

21. The further reduction expected in agricultural employment will affect all parts of the Region, with the areas round Perth, Forfar, Cupar, Montrose, and Blairgowrie being the most likely to suffer. The contraction in jute will affect, principally, the Dundee area, but there are also likely to be repercussions in other parts of the Region. The basic programme, therefore, requires industrial development throughout Tayside, and together with the housing programme this should mean that even without any net growth considerable development will be required in the next ten years.

22. With the findings of the regional survey as background, each local authority should be able to take steps to reassess its basic needs for houses and jobs up to 1981. Land and infrastructure needs can then be worked out in detail, and sites, which fit into the regional proposals, can be selected for development. Locations of first-phase industrial areas are indicated on Diagram 8.

THE GROWTH PROGRAMME

23. In relation to the long-term figures of +175,000 to +300,000 population the relevant range for 1981 is shown in Chapter 11 to be 33,000 to 56,000 additional persons. These figures have been adopted, therefore, as the working range for the purposes of the first phase proposals.

24. In considering where this early growth might be located we have taken into account current trends, recent investment and commitments, and with these considerations in mind certain parts of Tayside stand out as being particularly favourable locations for development in the 1970s.

25. Apart altogether from the attractions of its size and facilities, and despite the magnitude of its improvement and replacement problems, the Dundee area can be expected to attract a large part of whatever growth may occur in Tayside up to 1981. Recent and planned investment of public and private funds is giving the Dundee area some major new infrastructure which could support considerable growth; there are, for example, the Tay Road Bridge, the inner area road improvements, parking areas and traffic management schemes, the new central shopping areas, and the expansion of further education facilities.

26. The Perth area is also suitable for early development because of the motorway programme which will make this part of the Region highly accessible to the rest of Central Scotland by the early 1970s. Perth has also a basis for development as a regional recreational centre in the recently completed indoor sports centre.

27. Arbroath is also a favourable location. It has attracted some new industrial development in recent years, and with a population of 21,000 it has advantages over smaller towns in regard to development in the immediate future. The Burgh Council has shown considerable initiative in redevelopment and housebuilding, and has laid down a major new trunk sewer to open up a large area of land for early development.

28. St Andrews and Forfar are other areas that might succeed in achieving a faster rate of development than their basic programme would require. St Andrews has a comparatively sure basis for growth in the expansion of the University, and Forfar is a nodal point in a large catchment area.

Growth Options

29. The lower growth scheme of +33,000 population does not provide very much to distribute among the Phase 1 areas. There are various ways in which the total might be distributed, but the precise figures for individual areas are less important than the overall stimulus to the Region which the total build-up would entail. However, as a general guide for the local programming which will be required we are proposing indicative figures for each of the areas, and these are shown under the heading of Growth Option 1 in Table 5.1.

30. A similar distribution of the upper growth scheme of +56,000 is shown under Option 2. In this case, however, the overall amount of growth would be high enough to enable a specific step to be taken towards the long-term distribution put forward in Chapter 4, and, therefore, we outline two alternatives in relation to the upper figure. The first of these, which distributes the 56,000 increase broadly in the same proportions as the 33,000, is called Option 2A.

31. A big task is put on the Dundee area in Option 2A. An examination of the basic programme shows that, in the Dundee area, about 15,000 new dwellings would have to be built in the decade and that this would

TABLE 5.1 Summary of First Phase Options (1971–1981)

Areas	*Basic programme (for improvement replacement and current needs)*		*Growth Options*		
			Option 1 (Long-term target of +175,000) +33,000 persons	*Option 2 (Long-term target of +300,000) +56,000 persons*	
	Total population requiring new houses	*Population to be rehoused on new land*		*Option 2A with existing development agencies*	*Option 2B with a special effort at Perth*
	(a)	(b)	(c)	(d)	(e)
Dundee	45,000	32,000	17,000	32,000	20,000
Perth	6,500	4,000	8,000	14,000	25,000[1]
Arbroath	4,500	3,000	5,000	7,000	8,000
St Andrews	1,000	500	2,000	2,000	2,000
Forfar	2,500	1,500	1,000	1,000	1,000
Remainder of Tayside	21,500	11,000	–	–	–
Total Tayside	81,000	52,000	33,000	56,000	55,000

[1] 25,000 population target arrived at on the assumption of a special programme of 1,000 houses per year from 1974 to 1981.

involve the acquisition of over 800 acres of new land in addition to what is currently available for residential land according to current development plans and proposed amendments. Option 2A would superimpose on this a need to build a further 11,000 houses and require a further 1,550 acres. While we would prefer to see development of this magnitude in the Dundee area, in the first phase, we thought that consideration should be given to some alternative that would reduce the load on Dundee.

32. If the load on the Dundee area is to be reduced, and if the upper growth figure of +56,000 persons is to be retained, then there would have to be greater growth elsewhere as compared with Option 2A. We thought that if Dundee were to be relieved, there might be net advantages in mounting a special programme, with a special development agency, at a particular place outside the Dundee area instead of seeking a wider distribution. Option 2B, the alternative upper growth programme, provides for a special effort at some selected place outside the Dundee area and, on the basis of our studies, we consider that the most appropriate place for this would be the Perth area. Thus, in Option 2B, the first phase scheme for the Perth area might be put at an increase in population of about +25,000 (instead of +14,000 in Option 2A and +8,000 in Option 1). This would involve the building of about 1,000 houses a year from 1974 to 1981 over and above the 200 a year estimated to be required for the Perth area's basic programme.

33. Each of the first phase options set out in Table 5.1 shows considerable growth programmes at each of the phase one areas, even in the case of Option 2B with a special effort in the Perth area.

34. The case for a special effort at Perth need not be wholly a negative one but our own preference is for Option 2A for the following reasons. First, while Option 2A requires the Dundee area to mount a substantial building programme, it does not produce annual requirements hopelessly out of range of what has been achieved in the best years of the recent past. Second, Option 2B is less flexible than Option 2A. It involves a commitment which, in certain circumstances, could make it desirable in the course of the 1970s to support growth in the Perth area and virtually no growth elsewhere. It would be easier, at least, to fall back to Option 1 from Option 2A than to fall back from Option 2B, if growth were slow. Third, the evidence is that new industry is more likely to be attracted to the Dundee area than to the Perth area. This view must, of course, be qualified given the creation of a special agency for Perth. However this raises a more general question, applying not only to Dundee, as to the merits of having special executive machinery for a particular part of the Region. Another matter connected with industry is that Dundee will have, in the 1970s, the major problem of readjustment. Dundee's task of readjustment would, in our view, be helped if its growth programme were seen to be larger rather than smaller, and would be likely to be made more difficult by the existence of an exceptional effort at Perth supported by a special development agency. Fourth, there is the question of our long-term proposals for the creation of a city region. From that point of view we see possible disadvantages in a situation in which the Perth area would move so rapidly towards the position that we have envisaged for it, in the long term. In particular, we regard the industrial, commercial, social and cultural situation of the Dundee area as critical to the development of the Region's long-term potential and the creation of an effective city region. If too much happened at Perth too soon, too little could happen in the Dundee area for too long, to the detriment of the Region as a whole.

35. Whatever decision may ultimately be reached about the respective merits and demerits of Options 2A and 2B we must emphasise that the degree of success achieved in realising the Region's potential will depend heavily on the extent to which the different authorities of the area are willing to work together, towards regional objectives. Thus if there is to be a special effort in the Perth area, it must be because it is seen to be the best

way of implementing the wider regional scheme. We have pointed out, in the preceding paragraph, that while the Perth proposal might solve or transfer some problems, it would create others. There is, however, another important consideration: if the creation of a special agency for the execution of a big programme in the Perth area were to impair the basis of regional co-operation, already in evidence in the Tayside Consultative Group, it would do harm. We think it might.

36. We conclude that within Option 2, we prefer Option 2A to Option 2B. In what follows we discuss the overall programme in terms of Option 2A.

OVERALL PROGRAMMES 1971–81

Housing

37. With the larger growth programme, which of course includes the basic programme, about 47,000 dwellings would have to be built in Tayside between 1971 and 1981. This is an average rate of about 4,700 a year, which is roughly the level of building achieved over the period 1967–68. The Phase 1 proposals imply, therefore, a rate of building that has been achieved in the recent past. Table 5.2 shows the indicative housing programme for the Phase 1 areas.

38. Table 5.2 shows (a) the basic housing need against each first phase area given no growth in population during the period 1971–81. The figures shown under the head (b) 'high growth', indicate the housing demand stemming from the needs of redevelopment and a total first-phase population growth of some 56,000 people. The next two columns show the land needs for each of these population assumptions as (c) 'basic' and (d) 'high growth'. The figures show the need for additional or new land for housing and ancillary (education, open space and residual) use. They do not include the land already in residential use which will probably be redeveloped for the same purpose. The last column (e) indicates the acreage of undeveloped residential land within current development plans and in proposed amendments to these plans.

39. Housebuilding on the scale shown in Table 5.2 would mean a considerable demand for land in and around the existing towns. As stated earlier in this chapter most places should be able to provide for their basic programme within the areas already zoned for development, but areas of new land would be required to meet the growth programme. It is in the Dundee area that this problem will be most acute, for even without any net growth of population there is bound to be a large outward movement from the existing built-up areas. The basis for calculations in this respect are set out in Chapters 17 and 18 and the broad estimates are summarised in columns (c) and (d) of Table 5.2.

Employment

40. To provide for the replacement of job losses and for the employment needs of the high growth programme, about 45,000 jobs would be required in Tayside between 1967 and 1981. This includes the 21,000 required as part of a basic programme for the present level of population, about 18,000 of these being expected to emerge from the continuation of recent trends. Thus a further 24,000 jobs would be required to meet the needs of a population increased by a proposed upper growth figure of 56,000.

41. The high growth programme, including the basic programme, is estimated to require something of the order of 20,000 manufacturing jobs. It has been assumed that most of the new jobs in the services sector will be located in existing town centres and in new housing areas and, as in the long term proposals, provision has been made for this in estimating the acreage of housing land required. However new land will be required for manufacturing industry in the basic programme and further land will be required in the growth programme. We have estimated these land requirements generously, and at a basis of 25 workers per acre; it is obviously better to provide too much within limits, than to fail to provide enough. On these bases, the requirements for the whole Region might be about 500 acres for the basic programme and 850 acres for the combined programme.

42. As in the housing programme, the biggest effort in industrial development will be required in the principal Phase 1 areas. We are extremely reluctant, however, to break down by areas the regional estimates, for jobs and land required, in the same way as we have done for housing requirements. So far as the basic programme is concerned this would virtually require a forecast of those firms which are going to contract or to go out of business in the years up to 1981. Again, as is emphasised in the chapter on employment (Chapter 13) forecasts of the demand for labour in relatively small economic regions, and this means Tayside as a whole, may turn out to be very wrong. This warning applies with very much greater force to forecasts for Dundee or Arbroath or Forfar. For these reasons, we have decided not to publish detailed estimates by areas of the jobs required.

TABLE 5.2 Housing Requirements 1971–1981

Area	*Housing programme for Option 2A*		*Land needs – housing and ancillary uses*		*Residential land available according to current development plans*
	basic programme (a) *houses*	*basic + high growth* (b) *houses*	*basic* (c) *acres*	*basic + high growth* (d) *acres*	(e) *acres*
Dundee	15,000	26,000	1,550	3,100	720[1]
Perth	2,000	7,000	200	900	353
Arbroath	1,700	4,000	130	500	85
St Andrews	400	1,000	30	130	170[1]
Forfar	900	1,500	50	120	76
Rest of Tayside	7,000	7,500	350	350	556[1]
Total Tayside	27,000	47,000	2,310	5,100	1,960

[1] Includes proposed amendments to development plans.

43. We have however compared the industrial land available in the different areas, according to current development plans and proposed amendments to these plans, with the land likely to be required in the basic programme and in the high growth programme. Our conclusions are as follows:

(1) The Dundee area has probably sufficient industrial land available for the basic requirements, but would need an additional 200 acres, or rather more, for the high growth programme.

(2) The Perth and Forfar areas appear to have sufficient industrial land available both for the basic and the high growth programmes.

(3) The Arbroath area has sufficient land available for the basic programme but could require an additional 10–20% for the high growth programme.

(4) While St Andrews itself is unlikely to require any appreciable quantity of industrial land, St Andrews area (including Cupar) could be short of land, there being only 14 acres allocated on the development plan or the subject of amendment.

These conclusions are based on comparisons between aggregates, one of which is the industrial land available according to current development plans. It could be that the requirements and the land actually available do not match in location, *eg* where new housing areas would not be conveniently placed for land at present zoned for industry. This, however, is a matter for local planning. (Broad locations for new industrial land, not at present zoned, are shown in the detailed analyses in Part III.)

6 Development Costs

Introduction

1. This chapter discusses the development costs of the larger and smaller schemes of population expansion in Tayside. Three estimates are made. First, the total costs on the basis of a population increase of 300,000; second, the costs for an increase of 175,000; and, third, the costs incurred on the assumption that Tayside population continues to the end of the century at its 1966 level. The net cost of the larger development is estimated at about £850–£950 million (at 1968 prices) spread over 30 years. The net cost of the smaller expansion is about £530–£610 million. All the estimates are, for obvious reasons, of a most tentative nature. Much of the data required are unavailable, or highly uncertain, *eg* there are no detailed plans of physical developments.

2. The estimates must be taken only as indicating cost magnitudes which are subject to wide margins of error. Moreover, the estimates should be treated as increasingly unreliable, the more distant the time to which they apply.

3. The most important assumptions and limitations underlying the estimates are as follows.

(i) Factor costs are taken *at 1968 prices.*

(ii) Factor mixes are assumed to remain constant.

(iii) No allowances are made for changing or new technologies and their impact on costs and preferences.

(iv) Government policies are assumed to continue unchanged, apart from changes known at May 1969.

(v) In certain sectors, *eg* housing, roads, education, shopping, services, allowance is made for the effects of increasing real income on development costs.

(vi) To estimate the development costs of network facilities (roads, water supply, etc.,) distributions of increased population in future years were assumed to be appropriate to the possible long-term distribution given as Option 3 in Table 4.1.

4. Development costs may be defined as construction and civil engineering costs, and the costs of land acquisition and professional fees. Public and private investment in vehicles, ships and aircraft is not included, nor is private investment in plant and machinery. However it has not been possible to eliminate elements of plant and machinery costs from the construction costs quoted for the public sector.

5. While there were considerable variations in method among individual sectors, the broad outline of the method used to estimate development costs is as follows: the current level of sectoral investment was first estimated. Then future levels of development expenditure were estimated, usually as two components; first, estimates of changes arising from changes in population and incomes; second, estimates of the needs for replacement, improvement and renovation of the current stock of capital. Division into 'growth' and replacement' components is not entirely satisfactory since, for example, investment designed to increase capacity may be inseparable from elements of improvement.

6. The costs of land acquisition and professional fees cannot be based on detailed physical plans, so these costs are calculated arbitrarily as 20% of total building and civil engineering costs.

7. Some of the unit costs used as guide lines are given in an Appendix to this chapter.

Housing

8. Housing requirements are summarised in Chapter 17 (Table 17.10). The larger scheme of expansion (IMLF 1) requires 175,000 houses and the smaller (IMLF 2) needs 134,000. A no-growth situation would require the construction of 65,000 houses, this requirement being included in both of the growth estimates.

9. The significant elements affecting the average cost of house construction, assuming constant factor costs, are the density of development, the proportion of high-rise blocks, the extent of garaging, the size of the houses and their standards of construction. It is estimated that the average cost of a new house (including garaging and site development costs) built in Tayside between 1966 and 1971 will be about £4,050 *at 1968 prices.* It has been assumed that, allowing for falling densities, a lower proportion of high-rise blocks, increased garage provisions and dwelling size and improved standards, the average cost of a new house will rise to £5,000 by 2001, again *at 1968 prices.* A small allowance, not more than £15 million from 1971 to 2001, has been made for expenditure on improvement of existing substandard houses.

Education

10. Capital investment in education was projected in three components: investment in schools, in further education, and in universities. The main factor affecting school investment is growth in the numbers of school children, both through population growth and increased proportions in older age groups requiring school places (in the short term largely due to the raising of the school-leaving age). School requirements are outlined in Chapter 19.

11. The proportion of national product devoted to schools is expected to rise faster than the number of the children as a result of increasing expenditure on improvement and replacement, the latter being partly associated with the relocation of population due to urban development. The provision of further education facilities is assumed to increase, partly because of population growth but also in line with the current trend of

increasing provision *per capita*. Capital expenditure on the Universities of Dundee and St Andrews is expected to be independent of population growth in Tayside and is separately estimated.

Health and Welfare

12. Current capital expenditure on hospitals in Tayside is inflated due to the Ninewells development and is expected to fall after 1969. Further possible requirements have been detailed in Chapter 20 and our estimates are based on these guide lines. Minor works of replacement and renovation are assumed to continue with a 10 per cent per decade increase over the level of 1966–1971.

13. Capital investment in health and welfare services, other than hospital facilities, is estimated to be about £200,000 in 1968. In the long term, expenditure on expansion, renovation and improvement is assumed to continue at the current level *per capita*. Some allowance is made for expected schemes of capital expenditure, but this is not of great significance.

Sewerage and water services

14. In sewerage services, capital expenditure can be expected to increase in the near future, even if population expansion does not occur, since at present many burghs discharge untreated effluent directly into the Firth of Tay or the North Sea. If large-scale growth occurs, further investment will be necessary. Expenditure on the provision of estate sewers and house drains is included in site development costs and therefore excluded from this sector. Estimates for expenditure on sewerage and water services are discussed in Chapter 21.

Gas and electricity

15. No further significant investment in gas-producing plant is expected to occur in Tayside, conversion to natural gas being assumed to occur in the 1970s, at which time expenditure in the Region by the Scottish Gas Board will increase. No capital expenditure on new electricity generating capacity within Tayside transmission is allowed for in our estimates.

16. Expenditure by the gas and electricity industries on distribution, etc., has been projected from current expenditures more or less in step with changes in population.

Roads

17. Roads expenditure is one of the larger sectors. Investment was expected to be about £13 million in the period 1966–71. This excludes expenditure on estate roads which is included in other sectors. We made approximate estimates of some road costs (see Chapter 22) but we are unable to make estimates for the whole of the possible programme. For example, at this stage, there is not sufficient information to estimate the costs of intra-urban roads. Our roads estimates thus consist of two parts: one part is a combination of probable and indicative costs; the other part is an inadequately informed guess.

Manufacturing industry

18. Capital expenditure in Tayside on buildings for manufacturing industry (new buildings, extensions, major improvements and conversions to industrial use) is currently low; during the three years 1965–1967 *per capita* investment on industrial buildings was about one fifth of the *per capita* figure for Scotland as a whole. Given population growth on the scales proposed in the remit, the level of investment in industrial buildings in Tayside will have to increase considerably. The estimates in this sector were based on the numbers required to be employed in manufacturing in Tayside over the period 1971 to 2001, and on estimates of possible structural changes.

Services and construction industries

19. Capital expenditure on buildings for the services industries is projected as first, expenditure on shops (retail distribution) and, secondly, expenditure on buildings for other services (excluding those covered in other sectors, *eg* education).

20. Capital expenditure on shop construction and improvement in Tayside in 1967–68 may have averaged about £1.3 million per annum (£0.85 million in Dundee; £0.45 million elsewhere). Capital expenditure on shopping facilities is expected to fall in the short term, mainly because activity is currently inflated by a 'lump' of major development in Dundee. The principal bases for the projections in this sector were the estimated numbers required to be employed in the relevant industries between 1971 and 2001.

Primary Industries

21. Capital expenditure in Tayside in 1968 on new construction and major improvements of buildings for the primary industries (agriculture and fishing mainly, but also mining and quarrying) is estimated at £0.4 million. Future expenditure is expected to be substantially independent of population growth, and is assumed to continue unchanged up to 2001.

Total development costs

22. Estimates of total development costs for three population situations, covering the relevant parts of public and private fixed investment, are provided in Tables 6.1, 6.2 and 6.3. The estimates, we repeat, give only very approximate orders of magnitude. The larger scheme, an increase of 300,000 people by 2001 using population projection IMLF 1 (see Chapter 11), gives a total cost of about £1,800–£1,900 million. The net cost of the expansion is about £850–£950 million: this is the difference between the total cost and what is estimated in Table 6.3 to be spent assuming that Tayside population remains at its 1966 level. The corresponding costs of the smaller scheme, an increase of 175,000 people by 2001 using population projection IMLF 2, are about £1,500 – £1,600 million and £530 – £610 million, respectively.

23. The cost of expansion per head of additional population is estimated at £2,800–£3,200 for the larger scheme and £3,000–£3,500 for the smaller scheme. These costs may appear higher than have been suggested for other large schemes. We have, however, made allowances for the effects of increasing real incomes, and the aspirations that they may encourage (see paragraph 3

TABLE 6.1 Tayside: Sectoral and Total Development Costs, Projection IMLF 1 (+300,000 population)

£ million at 1968 prices

Sector	*1971–81*	*1981–2001*	*1971–2001*
1. Housing	185	595	780
2. Education, health, welfare	85	195	280
3. Engineering services and roads	80	175	255
4. Industry and trade	60	175	235
5. Total building and civil engineering costs	410	1140	1550
6. Land costs, fees, etc., (at 20% of (5))	80	230	310
7. Total development costs	490	1370	1860

Notes – 3. Engineering services consists of sewerage and water services, gas, electricity.
4. Primary and manufacturing industry, construction and services.

TABLE 6.2 Tayside: Sectoral and Total Development Costs, Projection IMLF 2 (+175,000 population)

£ million at 1968 prices

Sector	*1971–81*	*1981–2001*	*1971–2001*
1. Housing	165	430	595
2. Education, health, welfare	80	180	260
3. Engineering services and roads	70	150	220
4 Industry and trade	60	150	210
5. Total building and civil engineering costs	375	910	1285
6. Land costs, fees, etc., (at 20% of (5))	75	180	255
7. Total development costs	450	1090	1540

Notes – See Table 6.1.

TABLE 6.3 Tayside: Sectoral and Total Development Costs, Unchanging population level (1966)

£ million at 1968 prices

Sector	*1971–81*	*1981–2001*	*1971–2001*
1. Housing	110	170	280
2. Education, health, welfare	80	150	230
3. Engineering services and roads	60	100	160
4. Industry and trade	40	90	130
5. Total building and civil engineering costs	290	510	800
6. Land costs, fees, etc., (at 20% of (5))	60	100	160
7. Total development costs	350	610	960

Notes – See Table 6.1.

above). If, for example, the cost per house were assumed not to change between 1971 and 2001, the cost for the larger scheme of expansion would fall from £2,800–£3,200 to about £2,500–£2,900 a head.

24. We were unable successfully to pursue an attempt to compare the costs of development in Tayside with the costs of equivalent developments at other possible locations. We think that such comparisons, even assuming that it is possible to complete them successfully in time to be of use, could well produce differences that lay well within the margins of error that we would attach to estimates of total development costs. For what it is worth, Tayside probably offers some advantage over most other areas in the not very large sectors of the costs of sewerage and water services. Further small savings in *per capita* costs might be made relative to other regions because of the existence of unused capacity on parts of the inter-urban road system. On the other hand, our estimates of development costs do not include, as such, the cost of inducements to industrialists; these would be higher, at least for a period, than would be required in certain other parts of the UK. Again the unit costs of house construction are at present higher on average in Scotland than in England and Wales, but the true size of the differential and, more important, its behaviour in the future, are not certain.

25. Comparisons of development costs would, however, be only one side of the equation. Higher costs may be justified if they produce sufficiently large benefits. And these are difficult, if not impossible, to quantify fully. We may refer, for example, to our attempt to compare the costs of different schemes of development for Perth (Appendix to Chapter 25). Our view, in that case, was that the benefits of a more costly scheme were sufficiently large to justify its being preferred to the least-cost scheme of development.

Timing of expenditure

26. We estimated, also, total development costs by quinquennia and indices for the 30-year period are given in Table 6.4. We made rough estimates of the cost of the larger and smaller schemes of expansion on the bases of population projections IMHF 1 and IMHF 2. The costs of development were slightly lower, in the respective cases, than for the projections IMLF 1 and IMLF 2. Indices for the two high-fertility projections are included in Table 6.4. The behaviour of all the indices reflects, in the main, the growth of population.

27. As is to be expected, most of the expenditure falls after 1981; in both the larger and smaller schemes of expansion only about 16% or so of the *net* development cost arises in the decade up to 1981. The next decade takes about a third of it; while more than half the bill arises in the period 1991–2001. Broadly the same time-distribution holds good for each scheme, big or small and with a high-fertility or a low-fertility assumption. Most of the burden, therefore, falls some way into the future and, with growth going well, would be relatively easier to bear in a more prosperous UK, and, for its part, in a wealthier Tayside.

TABLE 6.4 Tayside: Total Development Costs by Quinquennia, 1966–2001

Total costs in 1966–71 = 100

Projection	*1966–71*	*1971–76*	*1976–81*	*1981–86*	*1986–91*	*1991–96*	*1996–2001*
1. 1966 level of population (no change)	100	90	90	80	85	85	90
2. IMHF 2 (+175,000 population)	100	100	115	115	125	140	155
3. IMLF 2 (+175,000 population)	100	100	125	125	130	145	160
4. IMHF 1 (+300,000 population)	100	100	135	140	155	180	205
5. IMLF 1 (+300,000 population)	100	100	145	150	165	190	210

Notes: The projections are described in Chapter 11 (Population).

They are ranked in *increasing* order of cost, *eg* the *net* cost of IMLF 1 is rather more than 10% more than that of IMHF 1 for an increase of 300,000 in population. In *present value* terms, with a discount factor of 10%, the differential in favour of IMHF 1 is also rather more than 10%. The differential is caused by variation in population structure: net immigration is a larger component of population in IMLF 1 than in IMHF 1 and this puts up the expenditure on housing and industry among other things

Appendix to Chapter 6

UNIT COSTS, ETC., ASSUMPTIONS

A1. All costs quoted are at 1968 prices and are averages for large increments.

A2. *Housing* (i) Average cost of local authority houses in Scotland (sub-structure, super-structure and external works but not garages, and excluding the cost of land, roads and sewers): £4.3 per square foot.

(ii) Average site development costs per dwelling (costs of site clearance and levelling, construction of estate roads and sewers, and lighting):

Density	*Average cost per dwelling*
(Dwellings per acre)	£
14	335
16	295
18	265
20	237

(iii) Average cost per dwelling where provided with garaging and hardstanding: £320 per dwelling.

A3. *Education* (i) Average cost per new place provided (including expenditure on sites, building work, furniture and fees):

primary schools:	£345 per place
secondary schools:	£485 per place

(ii) 175 full-time equivalent places for further education (other than university) per 10,000 additional population at an average cost of £780 per place.

A4. *Health and welfare* (i) The ratios for estimating the provision of hospital beds are given in Chapter 20.

(ii) 940 square feet per bedspace at an average cost of £9 per square foot.

(iii) 25 beds per 1,000 population aged 65 or over for old and disabled in welfare homes and occupational centres (for all facilities, public and private) at an average cost of £3,000 per bed.

A5. *Sewerage and water services* Costs and average costs are given in Chapter 21.

A6. *Manufacturing industry* Average floorspace of 270 square feet per additional employee in manufacturing industry at an average cost of £4.5 per square foot.

A7. *Service industries* (i) Average cost per additional employee in the service industries: £470 (estimated from new town data).

(ii) Average cost of new shopping floorspace: £5.7 per square foot.

A8. The data in the paragraphs above are, principally, our estimates based on data from a variety of sources. These included *Housing Statistics; A Selection of Unit Costs in Public Expenditure*, HMSO 1968; Scottish Home and Health Department; Scottish Development Department.

7 Implementation

1. Just as recommendations about specific commitments for growth are not our business, neither is implementation our business. We think it proper, however, to discuss certain issues related to this most important matter.

The major problems

2. Tayside's immediate problems concern its industrial structure and its urban fabric. Existing industry, in the next decade, may fail to hold unemployment and net outward migration at the levels of the recent past. Some 20,000 houses may need to be replaced, and a further 7,000 built to accommodate new households, all without any increase in population. This construction programme and the effort to allow urban areas to live with an ever-increasing volume of motor cars, impose a heavy burden of rejuvenation and restructuring.

3. A decision to initiate large-scale growth in the 1970s would bring further problems. It would then be necessary for the authorities in the Region to reach certain major decisions quickly. We realise that the present state of local government reform may make it difficult, but far from impossible, to act quickly in the necessary fields.

4. The tasks set by a policy of large-scale growth are considerable. First, the Region which has, for about twenty years, been losing employment at a rate of 0.4% per annum would have to begin to grow at about 1.6% a year from 1981 in order to realise the larger expansion scheme by 2001. Secondly, the Region which has been losing population for many years, would have soon to begin to gain population: for ordered and efficient progress towards an increase of 300,000 in population by 2001, net outward migration of about 2,500 persons a year has to be transformed into net inward migration of 5,000–7,000 persons a year from 1976 to 2001. Lastly, there is a housing requirement and all that it will involve in securing land and creating attractive residential areas. For the larger expansion, 47,000 houses would have to be built between 1971 and 1981. While this produces an annual average that has recently been achieved, more or less, it is still a formidable requirement. In the two following decades, a further 128,000 houses would be required by the larger scheme. And the housing programme is only the most substantial part of a much bigger demand for design and construction work.

5. We find it convenient to assume, for most of this chapter, that a policy for large-scale growth is adopted and moves towards our preferred long-term option (Option 3 of Table 4.1) through short-term Option 2A (Table 5.1). It is then possible, without frequent qualifications, to discuss the means by which those concerned may attempt to achieve this growth.

Implementation within the planning process

6. As we have already emphasised, this Report should be seen as the background document from which a strategic plan can be derived; it should not in itself be regarded as the strategic plan. We have not attempted to make definite recommendations for a strategy or for commitments to action - we have sought instead to analyse the problems and possibilities of Tayside so as to present information, analyses and proposals as a starting point for the strategic planning process.

7. We would, of course, endorse the view that definite recommendations could not properly be made without public consultation as envisaged by the Skeffington Report.[1] Clearly, the increase in population proposed for the next thirty years will have a major effect on Tayside, and it is therefore important that the people at present in Tayside should be adequately informed and that their opinion should be a most important factor in the final choice. The suggestions on structure plans in the Skeffington Report seem to provide a suitable framework for continuous consultation.

8. Although public participation can and should be a feature of the long-term planning, there are major difficulties in attempting fully to apply the process to consideration of the proposals we have made for the short term (Chapter 5). Our suggested first ten-year action period starts in 1971, and although the programme and what can be done will be heavily conditioned by existing commitments, some regionally-agreed modifications and additions will be required for a policy of growth.

9. Early decisions on whether or not to implement the development proposals are of great importance. This is not to say that the decision is so urgent as to preclude adequate discussion of the proposals. However, the longer net migration continues, the more difficult it becomes to complete the schemes of growth by 2001.

10. This is because the planned growth of population, considered in this Report, depends on the early establishment of net immigration. For this to happen, the Region will have, some time earlier, to be expected to become a more attractive place in which to live and work. In turn, decisions will have to be taken even earlier about sites for houses and factories. There is little time left if, for example, net inward migration is to be achieved in the 1970s. And the longer it takes to reverse present flows, the larger the rate of annual net immigration must be subsequently, or the smaller must be the growth achieved by 2001.

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[1] *People and Planning: Report of the Committee on Public Participation in Planning*, HMSO, 1969.

11. Regional co-operation is critical in the implementation of any such policy. We regard it as vital that some regional *ad hoc* joint committee should be able to consider our proposals and reach early agreement on the appropriate short-term action.

12. We hope that there could be rapid agreement on the major objectives which should cover at the very least the basic programme (Chapter 5). Following from this it would be for the individual planning authorities, in conjunction with their neighbouring authorities, to draw up statutory development plans in accordance with the agreed regional strategy. These development plans would define the areas selected for action in a first phase programme. Thereafter local plans prepared by the individual authorities would further the process of implementation.

Bodies involved in implementation

13. We have assumed throughout that existing administrative boundaries within Tayside can be ignored. This means that, at the implementation stage, it must be possible for the central and local authorities involved to co-operate with each other in the various steps of consultation, the formation of structure plans and the formation of local plans. Certain tasks are, however, to be assigned to particular bodies.

14. Implementation will be possible only if there is effective co-operation among the bodies who have responsibilities for the various components of development · investment and loan sanction, planning, housing, schools, factory sites, water, sewerage, control of countryside, etc. The problems existing here arise whatever the financial arrangements between central and local government. They will also arise however local government is organised, but they would be more acute the more local government is fragmented. Nevertheless the first steps in implementing growth and action on some of our short-term proposals would appear to have to be undertaken by existing local authorities.

15. Implementation in the longer term will be considerably easier if some such changes as those proposed in the *Wheatley Report*[1] are adopted. The boundaries of Wheatley's East Region agree very closely with those of Tayside and the machinery of local government would then be geared to operate at regional level.

16. The broad correspondence between the proposed East Region and Tayside is brought out in Diagram 9. In detail, the East Region includes the whole of Tayside together with the County of Kinross, and South Kincardineshire. It covers a slightly larger area and a larger population than Tayside (463,000 in 1968 compared with 452,000 in 1966). The inclusion of South Kincardineshire is justified by the Royal Commission because of its physical continuity with Strathmore in Angus and 'its economic links and communications with Dundee', and that of Kinross because of its administrative relationship with Perth.

17. The *Wheatley Report* proposes that the East Region should be divided into four Districts for local planning purposes: (1) Angus and South Kincardineshire (a population of 92,000); (2) Perth and Kinross (115,000); (3) Dundee (203,000); and (4) North Fife (53,000).

18. On industrial development – which is of prime importance for Tayside – the *Wheatley Report* recommends that powers to assist industry should be given to both regional and district authorities. The main work of planning industrial growth is to fall on regional authorities with district authorities having power to attract and aid industry within the context of their own structure plans.[2] The Commission saw 'great advantage ... in local authorities continuing to be able to stimulate growth by giving loans and providing factory space.'[3] Nor did they see any compelling reason why local authorities should not be enabled to offer more direct forms of assistance to industry, subject to appropriate safeguards.[3] We have reservations about some of these proposals for the district level and, on certain interpretations, for the regional level also. The effort to attract industry to Tayside should, in our view, be a regional function with very careful consideration being given to any share of this function that might be handled at district level.

19. Whatever the final result of the reorganisation of local government, we believe that some overall regional agency will have to be devised if Tayside is to make the most of its opportunities and especially if it is to be the location for large-scale expansion. Implementation in the short run will require some combination of functions on an *ad hoc* basis with, in effect, one body taking certain decisions for Tayside as a whole, and the various local authorities, as necessary, translating these decisions into action in their own areas. Clearly, whatever *ad hoc* arrangements are made, they should foreshadow the future organisation of local government in Tayside.

Finance and Costs

20. The development costs of implementing large-scale expansion are discussed in Chapter 6. Provided that the 175,000 or 300,000 people exist, most of the investment costs are unavoidable. Even if they do not live and work in Tayside, but in some other part of the UK, the infrastructure, etc., still has to be provided. What is of significance, however, is whether it would cost more or less to undertake the development in Tayside than somewhere else in Scotland or in the UK. We have noted that we were unable to make comparisons; and that it would not have been possible fully to assess the differences in benefits that must also come into an analysis of where best to develop (Chapter 6, paras. 24,25).

21. Social investment has to be paid for. This raises the question of the division of costs among different authorities. The impact, for example of the housing programme required by expansion, on the present structure of local government in Tayside could create financial difficulties that would frustrate development from the start, even given willing co-operation. Here again, however, we are in no doubt that the successful

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[1] *Report of the Royal Commission on Local Government in Scotland*, 1966–1969. Cmnd 4150, HMSO, 1969.

[2] Wheatley Report, page 202, paragraph 827.

[3] Wheatley Report, pp. 67–8, paragraph 227.

implementation of a scheme for expansion, certainly beyond the earlier years of the 1970s, will require a body of the Wheatley type or an *ad hoc* body with adequate powers to undertake certain necessary regional functions.

22. A second problem concerns the division of costs between the Region and the rest of the nation, represented in this case by the central government. Large-scale expansion goes beyond the needs or the capability (under normal financial arrangements) of the Tayside local authorities or those of a regional agency. It is part of planning on a national scale. Any scheme for major expansion will, in our view, require more than the normal finance-sharing arrangements between central and local government. In making any such special arrangements it will be necessary to have regard to the large basic programme of rejuvenation and restructuring that faces Tayside in the 1970s.

23. The division of costs between central and local government cannot usefully be discussed in detail in view of the current government reviews of local authority finance. We might, however, comment briefly on rate poundages. Rate poundages in Tayside, though comparable with those in other parts of Scotland, are high relative to those of industrial regions of England and Wales. One major difference lies in rates contributions to Housing Revenue Account; the average for county boroughs in England and Wales was under 7% (in 1966–67) while for Tayside it was over 30%. The future course of rate poundages in Tayside depends on many factors, not the least being the behaviour of the general level of prices. We attempted to project future rate poundages given large-scale expansion. There were, however, too many uncertainties but it seemed that the increase in the Region's rateable values that would be associated with development, will meet a large part of the increase in rateborne expenditure attributable to that development.

People and jobs

24. *People.* Much of any major increase in population, given successful development, would be contributed by the Region itself. For example, if net migration were reduced to zero by 1976 and remained at that level, Tayside's population could increase by between 60,000 and 120,000 people by the end of the century (Chapter 11).

25. Overspill agreements with authorities outside the Region do not appear likely to be significant in the immediate future. There may, however, be need to consider such arrangements after 1981 if pressure builds up in other areas.

26. The main source of population growth, in the foreseeable future, rests principally on the ability of Tayside to attract new population or to retain more of its existing population. For this Tayside must be seen as an attractive place in which to live, but the major factor will be the provision of a sufficient number of suitable jobs. Within this, the supply of manufacturing jobs will be critical.

27. *Jobs.* The Region will not provide sufficient manufacturing jobs, given existing policies, to support population expansion in the next decade. Indeed it may move in the opposite direction. Thus the attraction of new manufacturing industry is vital to growth.

28. No one is likely to underestimate the difficulties of attracting new industry to Tayside. The record of the past, even with Development Area advantages, is not impressive. Moreover, there will be no superfluity of mobile jobs in the next decade, and there is bound to be much competition for what will be available, some of it from Development Areas more favourably situated than Tayside. Whether the supply will improve after 1981 is a matter of speculation.

29. Tayside is remote from the regions from which most mobile industry originates. Firms having to move from these areas, or to expand elsewhere, tend to look most favourably on the nearest Development Area. But the major industrial areas nearest to Tayside are themselves in need of more manufacturing employment so that Tayside has to leap-frog a long way south before it reaches an area of potential supply. These considerations suggest that the financial inducements offered to industry may be too low for Tayside or too high for some other Development Areas. But these difficulties do not apply to foreign immigrant firms who will rarely find that travel time from their headquarters overseas is significantly greater at Dundee than, say, in the most attractive Development Areas south of the Border. In this context it should be stressed that Tayside's most notable industrial immigrants are foreign firms.

30. Tayside appears to need more than Development Area benefits, if growth is to be encouraged. How much will be needed on the financial inducement side depends on the other components of any possible policy commitment to growth, on the general economic situation and on inducements available in certain other areas.

31. Associated with such a commitment, there would presumably be infrastructure investment, financial assistance to local authorities, and possibly more substantial inducements than at present, as well as a stronger steering effort, to encourage potential immigrant firms to come to the Region. Infrastructure investment, additional to what there would be without planned growth, might best go into housing and industrial estates and the creation of advance factory space. The continuation of the improvement of road communications would also come high in any shopping list for aids to growth. But infrastructure expenditure, within any maximum likely to be considered, is uncertain in its power of attraction for new industry. Again, special financial assistance for local authorities would be related to the extra recurring burdens that fell on some areas from exceptional growth. Special financial assistance to industry could, in principle, take many forms.

32. Any suggestion that higher financial inducements for industry should apply to Tayside raises large policy questions. However the weight of the evidence is that inducements and differentials, as currently adjusted, do not bring mobile industry as far as Tayside, and the present package does not seem likely to attract enough industry, certainly from within Great Britain, to start

growth, and perhaps not even enough to halt contraction. We recognise that the circumstances in which the package is offered can be changed by a commitment to growth. There is also the promotional use that may be made of the possibilities for developing an attractive and modern city region within Tayside. Again, the creation of certain new development machinery within the Region could help (discussed in paragraphs 34–35). These factors might be enough to tilt the balance sufficiently in favour of Tayside even without changes in the present package of inducements to industry. This tentative view is, of course, very dependent on what is happening in the rest of the UK economy.

33. We venture one suggestion regarding industrial inducements. Given a growth policy, it would help if some minimum scale of payments, etc. could be guaranteed for some minimum period. Ideally the guarantee would apply to individual firms, but an arrangement of that sort would encounter administrative and other difficulties so that any such offer would have to apply to the Region for a given number of years. This raises the question of how long Tayside might need special help to attract industry. The answer depends, in part, on the size and circumstances of the initial effort. The time for review would be when net inward migration had shown itself to be increasing over a number of years.

34. We referred above to development machinery. The organisation and execution of regional industrial development policies is possibly the function, of all those proposed to be given to Wheatley's regional authorities, that is least adequately catered for under existing arrangements. We do not undervalue the efforts made by individual Tayside local authorities in the past. But they have not been continuous, they have not been professionally supported, and the Region's effort has been diffused. This Report provides data and support for a regional effort which would be very different from what has gone before. The focus of such an effort would be some form of development agency responsible, for the present, to a regional *ad hoc* group. The agency should not be simply a promotion agency, though that would be one of its important functions. Eventually it should become part of the regional machinery of government, but its establishment should not wait for the completion of local government reform. We realise that there is already much formidable competition in this field and that, inevitably, there will be more. This to us is a reason for doing something, not an argument for doing nothing. The agency is one of the ways in which the Region can develop that local initiative on which depends, in very large part, its future development.

35. The industrial development agency should have a small full-time staff which would seek out, convey information to, and maintain contact with potential immigrant firms. It might itself undertake, without commitment, the forward investigation of industrial sites and be ready with information for enquirers or contacts. Given the difficulties of attracting firms from the south, the agency might pay special attention to overseas firms who could be interested in a Tayside location. For the same reason, the agency might also be able to help the development or redevelopment of firms already in the area.

Life in 2001

36. There is a final point that lies in the background of any discussion of major expansion. It may be suggested that the fewer the people in the Region the better the living conditions can be. This would certainly be true had the population increased beyond e certain size. But we think that even the larger of the proposed increases of population could be accommodated within Tayside at high living standards. We would agree that a massive increase in population is not necessarily a desirable objective in itself. But there are other considerations. In broad terms, the standard of living of a region is positively related to the size of its population up to a certain point. When population growth can be accommodated, as is the case in Tayside, in such a way as to provide high living standards and a wide range of urban choice in a rural setting, there is much to be said for seeking the benefits that are likely to be best realised, over the years, by encouraging growth.

Immediate steps

37. We put forward the following suggestions for some immediate steps which might be considered appropriate. A regional *ad hoc* committee could:

(1) consider our Report in consultation with all interested bodies;
(2) submit views to the Government concerning long-term possibilities and short-term action;
(3) consider, in the light of the Government's views, action which could be taken with regard to (a) special measures for attracting industry and (b) the implementation of the basic programme;
(4) set up an industrial development agency;
(5) prepare in outline a first phase programme; and
(6) consult with local planning authorities concerning their statutory development plans which would define the areas selected for action in the first phase.

38. We appreciate that Tayside is only one of the many regions for which a case may be put forward for preferential treatment. We realise also that additional government support for Tayside may not be available in the short term. Should this prove to be the case, we hope that the Tayside authorities will find it advantageous to move ahead along the lines that we have indicated, though at a slower pace than might otherwise have been possible. One of our considerations, throughout, was to produce a flexible physical and investment programme of such a nature that the times at which the different objectives were achieved, including the long-run objective, could be varied without undue disruption and expense. Within that programme we have attempted to set out priorities so that, whatever immediate objectives are accepted, our guide lines should be capable of being translated into a regional strategy.

8 Physical Background

Size and Position

1. Diagrams 1 and 3 in this report show the situation of Tayside in relation to the rest of Scotland and to other parts of the Central Belt. The region lies at the open north-eastern end of Central Scotland and contains in its southern half extensive low-lying areas which have generally similar physical conditions to the developed parts of the wider Central Scotland region. Tayside is within two hours journey of the latter, and forthcoming improvements to communications are further strengthening its links to other parts of the country.

2. The boundaries of the region as shown on Diagram 10 represent the limits of Scotland's Economic Planning Region No 4 following, broadly, the watershed of the River Tay and its tributaries. In terms of its characteristics and activities this is an appropriate area for a regional planning survey, the only significant overlap with adjoining regions being in south-east Fife. Full account has been taken of the existing and potential relationships with this and other neighbouring areas.

3. Tayside, has an area of some 3,000 sq miles and contains a varied sample of Scotland's scenery and 452,000 of its population. The distribution of the latter between urban and rural areas, and between cities, towns and villages is described in the Area Studies section (Part III) of this report. Here we are concerned with the physical features which have influenced the development of the region in the past, and which give rise to various constraints and opportunities for the future. For a detailed and more technical account of this physical background various sources can be consulted; the most recent comprehensive report being the volume prepared for the meeting of the British Association in Dundee in 1968.[1]

Geology

4. The Tayside region straddles one of the major geological features of Scotland, the Highland Boundary Fault. The abrupt transition from lowland to upland along the line of this fault is a key feature in the geography of the region.

5. North of the Highland Boundary Fault the rocks are mainly schists, grits, slates and gneisses. These are the result of extensive metamorphic activity and have given rise to the characteristic rugged scenery of hills and glens. In addition large parts of the upland areas are covered by thick glacial depositis and by more recent accumulations of peat. These extensive moorlands are the nearest thing Tayside has to a true wilderness, but even here there are increasing intrusions for recreation, afforestation and water supplies.

6. The valleys and flood-plains of the Highlands are covered with fluvioglacial deposits and alluvium and the soils which have developed from these materials support the more prosperous elements of Highland agriculture and nearly all the population.

7. South of the Highlands, the rocks are mainly sandstones and lavas of Devonian and Carboniferous age. The features of the landscape result from the erosion of a pattern of synclines and anticlines. Thus, Strathmore, immediately south of the Highlands, was formed from a syncline, as was the Howe of Fife, the basin in the southern part of the region. Between these two depressions a broad arch was forced upwards and subsequent erosion of this exposed the underlying volcanic rocks. A down-faulted block of softer rocks along the axis of this anticline has been largely eroded to provide the valley now occupied by the Tay Estuary. The northern limb of the anticline forms the Sidlaw Hills and the southern part, the Ochil Hills.

8. In the northern parts of the lowland zone the solid geology is generally overlain by widespread fluvioglacial deposits derived from the Highland quartzites and schists. Extensive fans of yellow-brown soils formed from these deposits are found where the mouths of the glens open out into Strathmore. Because of their coarse texture these areas are fairly well-drained, and it is on these sites above the damper soils of Strathmore that some of Tayside's ancient burghs have been built.

9. Throughout the lowland zone there are large deposits of alluvium, ranging from sandy gravel to silty fine sand. This is found on the floodplains and river terraces of existing and former river channels and old lake beds in Strathmore, Strathearn and Stratheden, and also on the raised beaches and former estuarine areas in the Carse of Gowrie and along the coastal plain of Angus and Fife.

10. The most significant features of Tayside geology, from an economic point of view, are the limestones, the volcanic rocks, and, particularly, the superficial sands and gravels. The latter are widespread in the lowland areas, and much of the material is suitable for concrete aggregates.

11. Detailed information about the solid and drift geology of Tayside was obtained from the Institute of Geological Sciences. This was mapped on a set of 1-inch to 1-mile sheets and these have been used in the physical appraisal work. Similar information about the soils of the region was obtained from the Macaulay Institute, and the Department of Agriculture provided an assessment of soil quality from the point of view of its agri-

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[1] S.J. Jones (ed), *Dundee & District*, BAAS, Dundee, 1968.

cultural productivity. This is further discussed in Chapter 9.

Topography

12. Three quarters of Tayside is a sparsely inhabited area of uplands and narrow glens. In the north and west the Grampian Highlands rise to a heavily dissected plateau with a general height of 3,000 ft above sea-level. South of this there are the lower hill masses of the Sidlaws and the Ochils, and in the extreme south the Lomond Hills straddle the regional boundary in Central Fife. The amount and location of high land gives Tayside a scenic quality which represents a great asset in competing with other regions for development. An analysis of the landscape from the point of view of the conservation and exploitation of this asset is described in Chapter 3, on the physical survey procedure, and an assessment of the recreational potential is included in Chapter 10.

13. The lowlands between these hill masses are an equally important element in the physical character of Tayside. There are other regions with more and bigger mountains, but the special quality of Tayside lies in the wide variety of scenery within a comparatively small area of about 40 by 80 miles, and in the juxtaposition of upland and lowland areas.

14. In the latter category the principal feature is the coastal plains and the broad estuary of the River Tay which cuts into the heart of the region from the North Sea. This area contains the five largest towns (Dundee, Perth, Arbroath, Montrose and St Andrews), the major elements in the communications system and the ports and harbours. South of St Andrews, in the East Neuk of Fife, the coastal plain borders the Firth of Forth. In this area, several small fishing ports represent points of great recreational attraction on the rocky coast. A survey of coastal conditions and resources in this and other parts of the region is included in Chapter 10.

15. North of the Tay estuary lie the Sidlaw Hills and beyond these is Strathmore. This has an average width of about six miles and extends for some forty miles in a generally north-easterly direction along the edge of the Highlands. It is an important routeway containing several historic small burghs. Strathmore contains some of the best of Scotland's farmland and, with its various historic sites and buildings, its low hills and wooded areas, provides a splendid contrasting foreground to the Highlands to the north.

16. In the western part of Tayside the largest area of lowland is the Earn basin lying between the towns of Perth and Crieff, the Highlands in the north and the Ochil Hills in the south. The landscape and land use in this area are generally similar to those of Strathmore, and similarly complement the adjoining upland areas.

17. South of the Ochil Hills, in North Fife, is another great lowland area comprising the Howe of Fife and Stratheden. This area is less tightly enclosed by high hills and is crossed in both east-west and north-south directions by major road and rail routes. The south-western corner is dominated by the steep northern slopes of the Lomond Hills. This part of Tayside, like the other lowland areas already mentioned, has a high proportion of good quality farmland and also considerable wooded areas. The combined effect of these and the small towns and villages provides a highly attractive introduction to the region for traffic approaching from the south.

Rivers and Lochs

18. The principal river in the region is the Tay. This drains an area of 2510 sq miles which contains 70 freshwater lochs. Its main tributaries are the Garry, Tummel, Isla, Almond and Earn. The Tay flows right across the region and represents a major influence on the scenic character, the settlement pattern, the communications system and the location of economic activities.

19. Downstream from its sources in the north-west, in the Rannoch and Crianlarich areas, there are several large lochs contained in deep basins within the Perthshire Highlands. The largest of these is Loch Tay which, at 14 miles long and one mile wide, is one of Scotland's largest inland lochs. North of the upper Tay valley, in the broadly parallel Tummel Valley, are Loch Rannoch (10 miles long) and Loch Tummel (6 miles long), and southwards, in the upper Earn, is Loch Earn (7 miles long).

20. Together, these great water-areas represent a valuable asset for the whole of Tayside, and for adjoining regions, in terms of recreational opportunities and potential water supplies for industrial and residential development. An assessment of the lochs from these points of view is included in the reports on recreation and engineering services in Chapter 10 and 21 of this report.

21. The confluence of the Rivers Tay and Tummel is about 4 miles south of Pitlochry. From here the Tay flows in a broad valley south-eastwards for another 7 miles to Dunkeld, which stands amid the transitional belt of low foothills on the edge of the Highlands. This valley provides a very important routeway through the mountainous northern part of Tayside. The main communications to northern Scotland follow this passage, and the principal service centres, hotels and schools etc are sited at the various junction points along it.

22. South of Dunkeld the Tay winds across the western end of Strathmore and is joined by the rivers Isla from the east and Almond from the west. The former drains a large part of the Highland massif and the Angus Glens east of the Tay valley; and the latter the extensive upland area between Loch Tay and Loch Earn. These large tributary systems provide, therefore, comparatively easy access to the upland areas bordering on lowland Tayside, facilitating their use for forestry, farming and recreation. Apart from this, all of these rivers are potentially valuable in terms of water supplies, power potential, fishing and wildlife.

23. Perth is situated at the point where the Tay breaks through the Sidlaw Hills. This is an important bridging point on the Tay and a key point in the communications system of the region. It is the point at which the river enters its tidal estuary, and Perth has in fact on its river

frontage an area of docks and associated facilities for the handling of coastal shipping. The Firth of Tay stretches for a further 25 miles until the open sea is reached a short distance east of Dundee.

24. This great estuary is, on the one hand, one of Tayside's principal assets, bringing its own wildlife, landscape and recreational activities deep into the heart of the region. On the other hand it is a barrier to communication, for until very recently there was no road bridge below Perth and even now the crossings are limited to the road and rail bridges between Dundee and Newport in North Fife. This focussing of cross-river traffic on Dundee and Perth has the effect of adding to the town planning problems which these two cities are experiencing in their capacity as the principal service centres of the region.

25. There are three major rivers independent of the Tay system. In the north-east corner of the region the Rivers South Esk and North Esk rise in the higher parts of the Angus Glens and flow for some 30 miles across Strathmore and the Howe of the Mearns to the sea in the vicinity of Montrose. The upland sections of these valleys have similar attributes to the upper reaches of the Tay and its tributaries.

28. In the south-east corner of the region the River Eden rises in the Lomond Hills and meanders eastwards across the Howe of Fife to enter the sea at St Andrew's Bay. This is more of a lowland river than the others already mentioned and its resources are more fully exploited.

Climate[1]

27. The eastern half of the Central Valley of Scotland has a climate characterised by cool but sunny summers and generally cold winters. These general characteristics vary, however, between different parts of the region as a result of position and topography. The Highlands in the north and west give shelter to much of the region from winds from these directions, producing a 'rain shadow' effect over considerable distances. As a result, the lowland areas have a low average rainfall, and sunshine averages are high for the latitude. On the other hand, southwesterly winds have fairly easy access to the region, the Firth of Tay in particular forming a wind funnel directed at the Dundee area. The coastal areas are also exposed to the east winds blowing inland from the North Sea.

28. The 'rain shadow' effect of the high ground to the north-west is particularly apparent in Strathmore, and over the lowland areas as a whole the average rainfall is only about 30 inches. It is least on the eastern coastal belt (the annual average at Leuchars and Arbroath is just over 26 inches) and rises to about 35 inches or so on the higher ground. Only in the high uplands of the west and north-west does rainfall exceed 40 inches per annum. However, seasonal distribution is fairly similar throughout the region; February to June being the driest period, with April usually the driest month. October is usually the wettest month, with a secondary wet period in July and August.

29. Most of Tayside has a fairly low snowfall, but in the upland areas of the Highland zone there is an accumulation of snow between December and April which has led to the growth of winter sports activity in recent years. The average number of days per year with snow lying increases from about 13 at Arbroath, to 22 at Dundee and about 60 in the upper parts of the glens.

30. Tayside is one of the sunniest parts of Scotland. Coastal areas receive most sunshine in June, inland areas in May. The annual range of mean monthly temperature is 11°C near the coast, rising to 13°C inland. January is the coldest month, with a mean temperature of around 2.5°C, and July is the warmest month. The length of the growing season is around 240 days, becoming shorter as height above sea level increases. Growth normally starts about the third week in April and lasts until middle or late November in the coastal areas (including Perth).

31. There is less fog and better visibility in the Dundee area than in most places in Scotland, with the exception of the extreme north east. Haar, or sea fog, tends to develop in the spring and early summer when easterly winds are most frequent and the sea is more likely to be cooler than the air. It can be persistent in coastal areas, but is usually cleared inland in the course of the day.

32. The statistical indicators of climatic conditions in Table 8.1 show how Tayside compares in this respect with other parts of the country.

Nature Conservation

33. The Highland parts of the Tayside Area contain a number of important features not found elsewhere, some of which have Nature Reserves established for their conservation. There are two main field centres for nature study in the region. The Scottish Field Studies Association runs courses suitable for sixth formers, undergraduates and teachers at Kindrogan, and Edinburgh University has its own centre near Killin for instruction in mountain and water sports and field studies. There are other small centres run by the various education committees for physical training and nature studies. On a smaller scale the nature trail is also playing its part in natural history education. Not only the Nature Conservancy but also the Forestry Commission, the National Trust for Scotland, the Scottish Wildlife Trust and some local authorities have built trails in Tayside in the last few years.

TABLE 8.1 Comparative Statistics of Climatic Indicators

	Annual Rainfall	*Days of rain per annum*	*Hours of sunshine per annum*	*Average Temperatures*	
				January	*July*
Dundee Area	30 ins.	180	1396	2.5°C	14–15°C
Glasgow Area	40 ins.	212	1243	2.3°C	15°C
London Area	24 ins.	175	1518	4.5°C	17. 7°C

Source: Met. Office publications

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[1] From data provided by the Meteorological Office.

34. There are six National Nature Reserves and thirty-three sites of Special Scientific Interest within the Tayside Area. Seven of the SSIs are geological, the remainder botanical, zoological or a mixture of interests. Where there is a zoological interest it is usually ornithological. In addition there are at least fifty areas of known natural interest which have not been officially designated so far. Some of the principal sites of natural or scientific interest are included in the Places of Interest shown on Diagram 13.

35. The following paragraphs summarise the characteristics of the National Nature Reserves and of the equally extensive Ben Lawers area which is virtually of NNR status although designated an SSI for administrative reasons:

(a) Caenlochan (8991 acres). Between Glen Clova and Glas Maol. The special botanical interest here derives mainly from the presence of lime-rich rocks and other distinctive outcrops in a comparatively dry continental climate in contrast to the wetter conditions in the western Highlands. The animals of the Reserve include Red Deer, Ptarmigan and Golden Eagle. Authority is required to visit the Reserve in late Autumn and Summer.

(b) Isle of May (140 acres). Lies in the Firth of Forth about five miles east of Anstruther. First became a focus of ornithological attention as long ago as the end of the last century and migration research has been carried out there since 1907. In 1947 a Bird Observatory and Field Station was set up under a Joint Committee which now manages the Reserve on behalf of the Conservancy.

(c) Morton Lochs (59 acres). These artificial lochs lie on a main migration route for wildfowl and waders. A permit is required to visit parts of the Reserve away from the roads. The main object of management is to ensure minimum disturbance so that the birds will continue to visit and to breed. Surveys of the vegetation as well as the birds and invertebrate fauna are in progress.

(d) Tentsmuir Point (1249 acres). An outstanding area for the study of coastal sand accretion and the subsequent stages of plant colonisation. The Reserve comprises a large area of foreshore, the Abertay sands, which is a winter roost for wildfowl. Seals are frequently to be seen there. Behind the foredune is an area of willow and alder slacks with small patches of marsh. Wheeled transport on the sands within the Reserve and access to the Abertay Sands are prohibited.

(e) Rannoch Moor (3704 acres). The Moor lies at an altitude of 1,000 ft. It is one of a series of bog areas of different types and is the only Reserve exemplifying shallow high altitude blanket bog. There is an interesting bog flora.

(f) Meall nan Tarmachen (1142 acres). This is one of a chain of Reserves of botanical and geological importance in the Central and Eastern Highlands. A good range of vegetation types is represented, the richest occurring on bands of calcareous schist. Plant growth is particularly luxuriant on ungrazed cliff edges. The geological interest includes a striking series of cliffs, corries and summit ridges formed in rocks of the Dalradian series. Permission is required to visit the Reserve in late summer and autumn.

(g) Ben Lawers. This peak is the highest point in Perthshire at 3,984 ft. Its southern slopes are in the care of the National Trust for Scotland. In co-operation with the Trust the Nature Conservancy have prepared a nature trail on the slopes of Sron dha Murchdi, one of the lower hills of the Lawers range. Its purpose is to enable the public to learn something about the area which has been famous for centuries for its alpine flora. The circular walk takes about 1½ hours and passes burnside, bog, grassland and alpine communities. There is an information centre manned by part-time wardens during the summer months.

Summary

36. In its physical characteristics Tayside has several attributes that would be of importance in its own development and in competition with other regions.

37. The most striking feature is the variety of the physical environment and the high amenity and recreational value of nearly the whole area. Both uplands and lowlands have their recreational uses and the many rivers and lochs as well as being important for this, are a potential source of water supply for population within and outside Tayside. The fertile soils are the basis of the attractive and varied rural landscape and of the highly productive agriculture.

38. The second most evident feature is the amount of land suitable for development. Of the total extent of some 2 million acres, at least a quarter is easily developed lowland with all the attributes of highly attractive residential areas, and a large part of this is also flat enough to meet the needs of a large variety of industries. Most of this land is close to existing towns and communications, and within easy reach of the potential recreational areas in the other parts of the region. Quite clearly, therefore, there are no physical difficulties in accommodating a further 300,000 persons within Tayside, and there is in fact space for a larger expansion than this. Any expansion would, however, need careful planning to ensure that the region retains its attractiveness.

39. Tayside can be divided into distinctive areas for more detailed study. The core of the region is the area south-east of the Highland Boundary Fault, including the lower Tay and its estuary, the coastal lowlands, Strathmore, the Howe of Fife, and the Sidlaw and Ochil Hills. South-east of this is the East Neuk area of Fife, to the west is the Earn basin, and on the north are the Highlands, split into nearly equal halves by the Upper Tay valley. Part III of the Report considers the prospects of the principal communities in each of these sub-regions in the light of the general surveys described in the following chapters.

9 Agriculture, Forestry and Fishing

1. Agriculture has a significant role in the economy of Tayside, and the agriculture of the Tayside region is an important component of Scottish agriculture. The region has an area of 2 million acres (13% of the Scottish total) and within that total some 350,000 acres are high quality farm-land (Classes A and B+). This agricultural land, which is shown on Diagram 11, is among the most fertile and productive in Scotland, and it gives the region variety and versatility in farming types. Tayside is predominantly arable, with emphasis on its more intensive forms, and its other farming types also tend to be intensive, *eg* poultry, pigs.

2. The fertile valleys of Strathmore, with the Carse of Gowrie, the plains east of Dundee, and North Fife are the main areas for arable farming. Mixed and rearing farms are found on the slopes of the Sidlaws and the lower reaches of the Grampians. Diagram 10 shows the position of these areas and the other physical features of the region.

3. In common with the rest of the country, the drift of labour from the land has been considerable but, even in 1968, the 5,600 agricultural holdings of the region employed about 10,400 workers. The total agricultural population of about 16,000 farmers and workers represented about 5% of the working population of the region and 15% of those engaged in agriculture in Scotland.

PRODUCTS

4. Details of the output of the industry are given in Tables 9.1 and 9.2. In these tables, the data refer to the Counties of Fife, Perth and Angus. While the area covered thus exceeds the Tayside region, the general picture is not significantly affected.

Crops

5. Forty per cent of the region's total acreage of crops and grass is under cereals, and this represents more than a quarter of the Scottish cereal acreage. Within Tayside, barley is the most important cereal product, the 1968 acreage of over 200,000 representing more than two thirds of the region's cereal acreage. The 33,000 acres under wheat constituted more than a third of the total Scottish wheat acreage. In the period 1960–68, the barley acreage in the region has increased by 190%, this increase being associated with a decline in the acreage under oats.

6. The potato crop, valued at over £8m per annum, is the region's most valuable cash crop. In 1968, Tayside had about half the Scottish potato acreage including the acreage under seed potatoes, the output of which is substantial. Seed potatoes are grown largely for export to England and overseas.

7. One of the features of the area is its large acreage of soft fruits and vegetables. The main fruit is raspberries; the region, and Hungary and Yugoslavia, being the only significant producing areas in Europe. The output of soft fruit and vegetables is used, in the main, in the processing industries.

8. The high proportion of the Scottish crop of sugar beet in the area is associated with a processing factory at Cupar. While the 1968 acreage of about 7,000 acres was 50% below the 1960 level, the 1969 acreage is expected to be about 13,500. This still falls below the factory's allocation of 16,000 acres. It has been announced that the factory will close in 1972. The factory employed, in the high season, about 250 workers and dealt with up to £400,000 worth of local produce.

Livestock

9. Tayside's share of the Scottish crop acreage in 1968 ranges (with the exception of oats) from just under 30% to more than 90%, but the region's shares of the Scottish livestock population range from 9%–25% only. Since 1960, there has been some decline of emphasis on the rearing and fattening of animals which has been associated with a trend to cash cropping. The dairy herd has also declined, by about 11% since 1960, and the small dairy farm has tended to disappear in favour of the larger, more intensive unit.

10. Poultry production is increasingly being concentrated in large intensive units. Whereas the hen population has risen by 60% since 1960, broiler production has risen by 490%. Again, pigs in the region are reared almost solely in a few intensive rearing units.

STRUCTURE

11. Table 9.3 shows the relative importance (as measured by the standard man-days of employment offered) of different farm types within the region's 5,600 holdings, and compares it with that of Scottish farming. The exceptional importance of arable farms is clear, and the significance of intensive farming, covering such activities as soft fruit production, pigs, and poultry, is also evident. The relatively low proportion of dairy farms in the region should be noted, the high figure for Fife being influenced by the inclusion of the non-Tayside part of Fife.

12. Farm units in the Tayside region are, on average, significantly larger than in Scotland as a whole, and the tendency in recent years has been for the larger units to increase in importance. Taking the acreage in crops and grass as an indicator, whereas the total number of units declined from 6,400 or so in 1960 to 5,600 or so in 1968, the number of units in the 300 acres or more group increased from 654 to 727, and those with less than 150 acres fell by nearly 900. In 1968, 35% of the units were in the size groups of 150 acres or more, and

TABLE 9.1 **Crops and Grass in Tayside* and Scotland, 1968**

Commodity	*Scottish acreage*	*Tayside* acreage*	*Tayside as % of Scotland*
Wheat	89,434	32,858	36.7
Barley	711,416	201,403	28.3
Oats	345,745	53,642	16.5
Total corn	1,146,595	287,901	25.2
Seed potatoes	63,011	37,172	59.0
Total potatoes	118,212	58,432	49.5
Sugar beet	8,622	8,901	80.0
Vegetables	12,670	4,909	38.7
Peas (freezing etc.)	4,092	3,096	75.7
Carrots	1,477	954	64.6
Soft fruit	10,117	8,241	81.5
Raspberries	7,542	6,923	91.8
Strawberries	1,845	1,109	60.1
Blackcurrants	156	65	35.3
Other soft fruit	573	153	26.7
Total crops and grass	4,281,808	759,121	17.7

*Tayside = Counties of Fife, Perth, Angus. Source: DAFS, 1968

TABLE 9.2 **Livestock in Tayside* and Scotland, 1968**

	Scotland (Thousands)	*Tayside* (Thousands)*	*Tayside as % of Scotland*
Dairy cattle	681	61	9.0
Beef cattle	1,396	206	14.7
Pigs	550	95	17.3
Poultry	8,797	2,245	25.5
Sheep	7,849	1,007	12.8

*Tayside = Counties of Fife, Perth, Angus. Source: DAFS, 1968

TABLE 9.3 **Relative Importance of Farm Types in Tayside* and Scotland, 1968**

	Scotland	*Angus*	*Perth*	*Fife*
		Percentages		
Hill and upland	18	5	19	3
Livestock with arable	16	6	11	8
Cropping	21	59	42	52
Dairy	29	11	10	27
Intensive	8	17	16	8
Part-time	7	2	3	2
	100	100	100	100

*Tayside = Counties of Angus, Perth and Fife. Source: DAFS, 1968

rather less than 50% of the units had less than 75 acres in crops and grass. Of the total acreage in crops and grass in Perth, Angus, and Fife, in 1968, 78% was in the 1,900 or so largest units with 150 or more acres.

LABOUR

13. In 1968, the Tayside region (defined for this purpose as the Counties of Perth, Angus (including Dundee), Fife) with about 14% of the Scottish labour force had over 20% of the agricultural labour force. According to the June Census of the Department of Agriculture, there were some 10,400 agricultural workers employed in the area, compared with more than 17,000 as recently as 1960.

14. The districts in which the agricultural labour force is of relatively greatest importance are Perth, Forfar, Cupar, Montrose, and Blairgowrie. Those in which the drift from the land has been relatively most marked are Perth, Blairgowrie, and Cupar. There has also been, understandably, a decline in the agricultural labour force in the Dundee area.

15. Between 1960 and 1964, the number employed in agriculture in Tayside declined by 17% to about 14,100. In the years 1964–1968, the decline was even faster at about 26%. This is about the same rate of decline as in Scotland as a whole. But if specialist contractors, such as ditchers, drainers, sheep shearers, and some other categories of workers not included in the DAFS data, are taken into account as well as workers directly employed on the farms, the decline in Tayside, in the period 1960–1968, may be less than for Scotland. Another trend, which gives cause for concern, is the high rate of

decline in the younger male workers. In the period 1960–1968, the rate of decline for male workers under 20 years was 80% compared with a rate of about 30% for male workers of 20 years and over.

16. It seems difficult to believe that, in the absence of major changes in technology or in structure (which are not likely to take place quickly) the decline in the agricultural labour force can continue at the rates of recent years without causing a reduction in output. The balance of evidence from the farmers consulted suggests that the labour force cannot decline much more without causing output to drop. No doubt there will be further reductions; possibly a lower limit of about 8,000 or so, on the DAFS basis, might be taken as a reasonable guess for planning purposes for the later years of the century.

17. Agricultural workers, in the region, are housed almost exclusively in tied houses. There is evidence, however, of increased willingness to live in council or other non-tied housing some distance from the place of work.

18. At present, craft courses in agriculture are provided at Elmwood College at Cupar, Lawers School of Agriculture, Comrie, and at Arbroath. Courses at technician level are available at Elmwood College and to a limited extent at Lawers. Courses at craft and technician level in horticulture are provided at Elmwood and at Kingsway Technical College, Dundee. As recommended in the 1967 Report by the Scottish Technical Education Consultative Council a partly residential farm centre is being developed at Elmwood College. In addition the Report recommended such a college in the Coupar Angus/Blairgowrie area. Higher further education to degree and diploma level is available at the three Scottish Agricultural Colleges.

19. In addition to the categories of employment already discussed, the agricultural industry in the region generates indirect employment in other related activities. The marketing industries include agricultural merchants, grain retailers and buyers, livestock buyers and dealers, horticultural wholesalers, horticultural product processors, and meat processing from buyers, through slaughterhouses, to the final distributors. The requisites industries cover agricultural machinery, its supply, replacement and maintenance, and the supply of feedstuffs, fertilisers, chemicals, etc. A third category consists of the retailers, etc., who service the agricultural populations in Tayside. Employment in the marketing industries might be relatively higher than for Scotland as a whole because of the region's predominance in products for off-farm sale and the relative importance of food processing dependent on home-grown supplies. The employment generated in these sectors cannot be estimated with any precision and our best guess puts it in the range 8,000–14,000.

ECONOMIC PERFORMANCE

20. Data from the Edinburgh School of Agriculture, for a sample of Tayside farms, give some indication of the profitability of agriculture in the region. In 1966/67 (1965/66) the sample included 31 (36) arable farms of an average size of 310 (280) acres with average working capital estimated at £18,200 (£16,600). Including subsidies and production grants, the return on working capital employed was 18.0% (9.2%). In the same years, a sample of 13 (14) hill sheep farms of an average size of about 4,000 (4,100) acres with average working capital estimated at £12,500 (£12,300) gave returns on capital employed of 1.9% (8.7%). A sample of 12 (13) upland rearing ferms with an average of 480 (590) acres, and an average working capital employed of £9,300 (£10,200) showed returns on capital employed of 0.1% (4.8%). In the case of the hill sheep and upland rearing farms, where differences from the rest of Scotland are marginal, a feature is the increasing reliance on government support; the total of deficiency payments, production grants, and subsidies, can be more than 150% of the net income of a farm unit.

21. The estimates of profitability in paragraph 20 are based on a relatively small sample of farms, and they make two assumptions that may be criticised. They assume, first, current rents as a measure of the annual value to the farm business of the land and buildings component of fixed capital and secondly, a charge for the unpaid labour of the farmer and his wife of only £650 per annum. More realistic assumptions would reduce the estimated return on working capital from 18.0% in 1966/67 to something less than 10%.

22. The returns estimated for 1966/67 were not the poorest of recent years. Table 9.4 shows the trend of profit on Tayside farms in the period 1960–67.

23. In evaluating the significance of the profitability estimates, there is another factor to be taken into account. Land values have been rising, fairly sharply, in recent years. Some data are given in paragraph 26 below. The rise in land values goes some way to modify the impact of relatively low profits for owner-occupiers.

24. In general, except for dairy and hill sheep farms, the information available for Tayside farms suggested that

TABLE 9.4 Trend of Profit on Tayside Farms, 1960-67.
(1955/59= 100)

Type of Farm	*Arable*	*Hill Sheep*	*Upland Rearing*
1960/61	103	83	67
1961/62	126	156	106
1962/63	143	90	73
1963/64	54	113	65
1964/65	95	162	144
1965/66	97	164	141
1966/67	234	119	164

Source: Edinburgh School of Agriculture

they had higher net incomes, higher output, were larger units, and had higher levels and rates of capital investment than the same farm types in Scotland as a whole.

Rents and Farm Values

25. We could obtain only a small amount of evidence about the actual rents paid on Tayside farms. Data from a very small sample taken by the Edinburgh School of Agriculture, for 1967, indicate that the average rent per acre was £3.3 for arable farms, £2.8 for dairy farms, £2.5 for rearing and feeding farms and substantially less than a pound per acre for hill sheep farms. Recent changes in rents in Tayside are unlikely, on the evidence available, to have been very different from those in Scotland as a whole. In the three most recent years for which data are available, rents in Scotland, averaged over all farms, appear to have been increasing by something between 3.6% and 5.7% per annum. In any one year, only a relatively small proportion, 10% or so, of the total number of farms have their rents changed. Relatively large increases for these farms average down to the figures quoted.

26. The data in Table 9.5 are the best that could be obtained to give some general indication of agricultural land values in Tayside. They are based on the prices of farms changing hands and the prices per acre include houses, buildings, etc., but not crops, machinery, and livestock. The indications are, therefore, far from precise. Similar data for Scotland are included and they suggest that prices in Tayside are higher than the Scottish average. In Scotland as a whole, the trend in farm prices is fairly steeply upwards. For the four years 1963–67, the average increase was 21%, the increase being 25% for arable farms.

PROSPECTS FOR FOOD PROCESSING INDUSTRIES

27. The natural conditions that allow the region to grow large quantities of soft fruit (raspberries, strawberries, blackcurrants) and vegetables have given rise to a sizeable food-processing industry. Factories at Dundee, Forfar, Blairgowrie, Carnoustie, and Montrose, freeze, dehydrate, can, and bottle the produce of the area. Originally it was the possibilities for raspberries and peas that attracted processers and these two crops are still the mainstay of the industry. The output of raspberries has been running between 10,000 and 12,000 tons a year with a value of about £1½ million.

28. The future of soft fruit processing, especially in raspberries, depends on three factors: (a) the mechanisation of picking; (b) the development of marketing; and (c) future demand. If, as seems evident, the main constraint on increased production of raspberries is shortage of labour, any successful development of mechanised picking would be of great importance. With increased attention being given to the development of mechanical harvesting techniques, there seem to be good grounds for expecting commercial application of these techniques on a sizeable scale within the next decade or so. The higher capital costs of mechanisation would seem to require an increase in the acreage of fruit on lower ground or possible concentration of fruit farming in fewer hands. Availability of land is not seen as a significant constraint.

29. On the side of the producers, the marketing of fruit in the region is greatly fragmented. One large co-operative based at Forfar, the Perth and Angus Fruit-growers Co-operative, now acts as a buying and distributive organisation for a large number of the local fruit-growers. Future demand is difficult to estimate, but the demand for fresh fruit is unsatisfied at present and for most processed food demand is growing considerably. There seem to be possibilities for some increase in the size of this part of the industry in the Tayside region.

30. In vegetables, peas and carrots are the main crops. Beetroot, beans, and sprouts are also grown for processing. Because of climatic conditions and freedom from pests and diseases, the region is a major pea producer but has the disadvantage of being some distance from its markets. The pea-processing capacity in the area appears, at present, to be fully used and expansion of output would seem to require another factory or extension of existing plant.

31. Potatoes are of increasing importance in the processing industry. The region already grows substantial quantities of potatoes, its 60,000 acres representing 10% of the United Kingdom acreage. The demand for processed potato products (canned, dehydrated, etc.) has grown significantly in the past few years, and imports have substantially increased. The processing industry is already established in the area. Of the two largest producers, one concentrates on frozen chipped potatoes and the other on canned new potatoes. Given the probable growth in demand, and the region's ability to supply the produce, the attraction of new firms to the area, or the expansion of existing factories, seems to be a reasonable possibility.

TABLE 9.5 Sales of farm land*, Tayside and Scotland (1963-67)

Type of Farm	*Average price per acre* *Tayside*	 *Scotland*
Hill sheep	£	£
Upland rearing	. .	12
Rearing and feeding	. .	41
Arable	101	91
Dairy	186	184
	134	113

*Sales are from owner occupier to owner occupier, and the price per acre includes the value of houses and buildings, but not crops, livestock, machinery etc. Sales cover units of 20 acres and over.

Sources: DAFS, Edinburgh School of Agriculture.

32. Employment in all fruit and vegetable processing (including sugar beet) is of the order of 1,500 workers. Incomes in this industry are low and fluctuations in supply can severely affect the continuity of employment.

33. When questioned about possible locations for new processing plant, representatives of local farmers, on balance, favoured development in the general area of Dundee. It was also put to us that the Leven Special Development Area was a natural centre for food processing in Fife.

IMPLICATIONS OF POPULATION AND INDUSTRIAL EXPANSION

34. Absorption of agricultural land for roads, housing, recreational facilities, etc., is inevitable given significant growth in population and income. It also seems unavoidable that some of the land to be acquired will be of relatively high value agriculturally, due predominantly to the fact that good agricultural land is also well suited for building. While the theme of minimising the absorption for other uses of good agricultural land runs through this report and is part of our set of criteria for identifying areas for potential development (Chapter 2 and Part III), all conflict of interests cannot be avoided.

35. Demand for agricultural land will arise from three principal sources: the possible needs for housing etc. and industry, the possible needs for recreation, and the possible requirements of increased afforestation. Given an increase of +300,000 persons in the population of the Tayside region and a basic redevelopment programme as set out in Chapter 18, we estimate that the total requirement for housing and industrial development would be some 23,000 acres of agricultural land, of which some 6,000 acres might be Class A land. It should be noted, however, that even without any growth of population in the region there would still be a demand for something like 6,200 acres of land, principally to rehouse existing population that cannot be rehoused adequately on land already in non-agricultural use.

36. We think it highly improbable that the loss of 6,000 acres of Class A land (a loss that would be spread over a period of 30 or so years in which the intensity of land use and productivity are likely substantially to increase) would bring the agricultural output of Tayside below its best level of recent years. We realise that this proposition, even if it were acceptable to all, does not make in itself a sufficient case for switching land from agricultural to non-agricultural uses. But we do not pursue this matter further, principally for two reasons. First, this is not a discussion that can usefully be expanded at the general level. Second, we do not think it appropriate to speculate about the future demands on, or about future structural and technical developments in, agriculture in the United Kingdom and in Tayside. So much in modern British agriculture is dependent on the degree and direction of Government support, and this involves unknown policy decisions. Moreover, the rate at which the intensity of land use is likely to increase, and the degree to which the concentration of certain forms of agricultural production in areas relatively much smaller than at present will be taken, are matters of undoubted importance, but they are obviously matters on which we could obtain no reliable consensus of view.

37. In addition to the loss of land, population expansion is likely to have certain other effects on the agricultural industry in the area. First, increased population, and the possible expansion of some of the burghs in agricultural areas, may, in time and if necessary, go some way to reducing the industry's reported labour shortages. Secondly, an increased population is likely to create additional local demands for certain agricultural products. It is to be expected, for example, that dairy output would have to increase above its present level. Thirdly, an effect of increased urbanisation is a tendency of town-dwellers to become part-time farmers, and another effect may be that some farmers on the outskirts of towns become only part-time farmers, their incomes coming also from non-farming employment. In other areas, a noticeable fragmentation of the farming holdings around urban centres has taken place for these and, possibly, other reasons.

FORESTRY

38. The region has about 125,000 acres of planted forest land, about fifty per cent of which is owned by the Forestry Commission and the rest by individual landowners. The major forests are in the Tay Valley of Perthshire (80,000 acres) and in the Angus glens (30,000 acres) with the remainder in North Fife (15,000 acres).

39. The Commission owns about 126,000 acres and, of this, only 74,000 acres are planted or scheduled to be planted. This is because extensive tracts of the land owned remain in hill sheep farming or are above the economic planting limit.

40. The Commission's planting programme in the area is about 2,000 acres a year and present intentions are that this level should be maintained. However, if land acquisition does not increase in the near future, the reserves of plantable land will soon be exhausted. For many years past the rate of new acquisitions of land has been exceedingly low, largely because other land uses are considered more profitable by owners. It seems likely that this position will not change much in the foreseeable future.

41. The area of private woodlands amounts to 62,000 acres. Thirty-six thousand acres are in Perthshire, 17,000 in Angus, and 9,000 in Fife. Whereas the median size of forest owned by the Forestry Commission is about 2,300 acres, the median size in the private sector is very much smaller, probably not very much more than 60 or so acres in Tayside. Forty-four per cent of the private forests consist of areas of less than 50 acres, and about two thirds of them are less than 100 acres in size.

42. With the post-war plantations coming into the production stage, the volume of timber extracted from Commission forests is expected to increase between 1972 and 1975 to 2.4 million hoppus feet (hoppus foot - 1,273 cubic feet) which is twice the present level of extraction. The value of the output of the 1.2 million hoppus feet extracted in 1967 was just below £80,000.

Production from Commission forests is expected to double again between 1975 and 1985, and therefore (including the private woodlands) the total output of the Tayside forests in 1985 will be in excess of six million hoppus feet a year.

43. Direct employment in the forests is estimated to be about five hundred workers at the present time. It is probable that a somewhat similar number is employed in ancillary industries such as contracting, sawmilling, etc. Unless there is an increase in the planting programme, there is likely to be a decline in the labour force directly employed in the forests by 1975. After that time, as the rate of extraction increases, the total of direct and indirect employment in forestry is likely to increase above the present figure of 1,000 or so.

44. Housing has always been an important consideration in attracting labour to work in forestry. There has been a noticeable trend away from small forest communities to commuter working. However, a need for some houses in the forest areas is expected to continue.

45. It is probable that the output of smallwood from forests in the Tayside and North East Scotland areas could be sufficient to support a small scale pulp mill by around 1973. This inevitably over-simplifies the related problems of the most suitable type of pulping process, integration with an existing paper mill and a host of financial and economic considerations. Another possible outlet for smallwood is a chipboard plant that could in addition utilise sawmill residues and waste; but decisions about future developments of this kind are for the industries concerned to make. Rationalisation of the sawmilling industry, with the aim of achieving fewer units than at present, but each with a very much greater capacity, is under consideration. The Tayside region would seem eminently suitable for one such mill.

FISHING

Sea Fisheries

46. Sea-fishing was once an activity of importance in the region, but the industry is now greatly reduced in size. It is concentrated in Arbroath and Montrose in Angus, and in the East Neuk towns of Anstruther, Pittenweem, St Monance, and Crail. In these towns, some more than others, the industry is still of some importance in the local economies. Direct employment in the region as a whole is of the order of 700 persons, with perhaps up to 300 persons working in ancillary trades. In common with agriculture, the average age of the persons engaged is increasing as the proportion of younger men in the labour force decreases.

47. Small line fishing, because of competition from the seine-net fleet, has declined considerably, though a small fleet from Anstruther still fishes with great lines on distant grounds, landing its catch at Aberdeen. The main activity at the Tayside ports, at present, is seine-netting with boats carrying crews of four or five. These boats catch white fish; but in slack periods they supplement the mainly part-time fleet that fishes for nephrons (prawns/norway lobsters/scampi). There has been rapid growth in the market for these shell fish and lobsters. A peak catch in 1966 led to the establishment of the freezing and processing factory at Anstruther which absorbs all the nephrons catch of the region together with supplies from other areas. The requirements of the growing shellfish catch, and the needs of the fisheries in general, may be sufficient to justify the establishment of an ice manufacturing plant in Pittenweem.

48. Although there are fewer fishing ports in the Region than there were 20 or so years ago, the current catch is higher in quantity and in value. In 1968 the quantity of white fish landed was about 120,000 cwts, and its landed value was about £475,000. In the same year the quantity of shellfish landed was about 20,000 cwts, with a landed value of about £180,000.

49. A trend in the industry which has become apparent in recent years is the movement of a few Tayside-based boats to work out of Aberdeen.

50. The future of full-time sea-fishing in Tayside, so far as white fish is concerned, may be one of decline though there is some recent evidence of stability. Returns on capital are low and there is material dependence on government financial assistance. The increasing demand for shellfish and the existence of adequate supplies accessible to boats from Tayside ports offers a sector in which some growth may be possible. The labour force directly employed in the industry is likely to decline, but we are advised that employment in ancillary industries may remain steady and there is even a possibility of some small increase.

Salmon Fisheries

51. There are important commercial salmon fisheries in Tayside. One company, based in Perth, fishes the Tay. Another company, based in Montrose, fishes in that area. Employment in these two companies, at the height of the season, is about 300 persons. This total includes a very substantial proportion of seasonal workers. Almost all the salmon caught are despatched from the area in an unprocessed state.

10 Recreation and Tourism

1. Few regions of the British Isles contain such a variety of scenery and so great a range of recreational opportunities as Tayside. Excluding the tidal estuary of the Tay, the coastline of the Region is 85 miles long, a third of it being sandy beaches. Broad lowlands support a high standard of agriculture and great estates, some of which are open to the public. Further inland, foothills rise up towards the larger hills in the north and west which enclose narrow glens of great character and several large inland lochs. The river valleys linking these to the lowlands and the sea provide comparatively easy access routes into and through the upland areas.

2. The sporting and recreational attractions of the Region are already renowned, some of them internationally, as for instance the golf courses, the holiday towns and the salmon fishing in the Tay and other rivers. The diversity of the recreational resources and facilities, and the convenient location of these in relation to all parts of the Region are shown by Diagrams 12 and 13 in this chapter.

3. We are very conscious of the high quality landscape in Tayside and of the recreational opportunities which are available within 40 miles of the urban centres of the Region. As these represent a considerable promotional asset we have attached great importance to setting out guidelines for the co-ordination of future recreational developments, with the aims of keeping the supply of recreational opportunities in step with a mounting demand and of encouraging design standards appropriate to the high quality of the landscape.

4. Throughout this Study we have been concemed as much with the implications of current trends as with the growth of population indicated in the remit. This is particularly so in the analysis of recreation because it is evident from many sources (see Appendix 1 and 2 at the end of this chapter) that fundamental changes are taking place in the nature of recreational activity as a result of rising incomes and car ownership. The positive action which would be required to cope with these changes for the present population amounts to a substantial programme, and this would need to be increased if a large population growth were to take place. The guidelines which we are suggesting are intended to point the way towards satisfying demands for greatly increased recreation space with the minimum conflict with other uses.

5. Our analysis has been based on assessments of the existing situation, current trends and the opportunities offered in Tayside for each of the principal outdoor activities. The methods used in the surveys are not described in detail in this report but background information and basic maps are contained in the working papers of the Study (see Appendix 1).

6. In this chapter we set out the principal conclusions to be drawn from this material. The chapter is divided into four sections. The first deals with tourism, the second with the problems associated with the day trip by car into the countryside, the third summarises the principal existing recreational activities and notes their development potential, and the final section sets out the major items which we suggest should be considered in formulating policies and guidelines for the future. Diagram 13 shows our main proposals for the future pattern of recreational facilities.

TOURISM

7. No special surveys of tourism have been carried out as part of the Tayside Study but there have been surveys of accommodation in the past in connection with the County Tourist Development Plans (App.1.1), and the Scottish Tourist Board (App.1.2) has given statistics in its annual reports and also a general guide in its publication 'Where to Stay in Scotland'. The figures taken from these three sources show a wide divergence which presumably reflects on the one hand the unreliability of statistics compiled on the basis of voluntary returns, and on the other, the inadequacy of estimating accommodation by counting the number of officially advertised bedspaces. Taking all the minimum and maximum figures from the various sources the range of bedspaces in Tayside's hotels and guesthouses is from 10,000 to 24,000 and the spaces in touring caravan sites and tented camps from 12,000 to 16,500. The highest estimate for all overnight accommodation is almost twice the lowest estimate.

8. The accommodation figures derived from the County Tourist Plans can be broken down according to location while the S.T.B. figures refer only to numbers per county. About 50% of the hotels and guesthouses are to be found on the coast with a further 25% in Perthshire and the remainder scattered over inland Angus and Fife.

9. An S.T.B. poll of visitors (App. 1.2) has provided information on the type of accommodation in which visitors were staying, which indicated that in the Tayside Region a higher percentage of accommodation is available in hotels and guesthouses with less reliance on 'bed and breakfast' provision or holiday accommodation 'with friends' than is the case in Scotland as a whole. While this may be true of the Region as a whole, the Fife County Tourist Plan states that in Fife by far the greatest number of holidaymakers have to be accommodated in private houses during the peak holiday period (coinciding with the Glasgow Fair in July) when all accommodation is full to capacity. There are no figures available indicating the spread of demand for accommodation throughout the year but it is generally acknowledged that there is a pattern of extreme fluctuation; the

summer peak being felt everywhere, but especially in the small coastal towns in Fife. The summer peak is followed by a well-marked winter low in all but the area immediately influenced by winter sports. This leads to the winter closing of hotels in many areas. In Pitlochry (App.1.4) 40 out of 54 hotels and guesthouses close for up to three months in winter while in Aberfeldy the figures are 11 out of 17. In Perthshire alone 94 of the 214 establishments listed in 'Where to stay in Scotland' have a winter closing period specifically mentioned and actual closures are likely to be even higher.

10. These rather scanty facts summarise all that is known about the supply of accommodation in the Region. Little more is known about the trends in demand. The S.T.B. has estimates of the numbers of visitors to the Region over the last few years which show a small but steady rise in demand in Angus, a sharper rise in Fife, and a generally static demand in Perthshire. That this demand is strongly seasonal as suggested by the high number of winter closures already mentioned, is confirmed by the low average occupancy rate of all types of accommodation; hotels average about 36% occupancy and guesthouses generally less than 20%. These figures are to be compared with a British average of 60%.

11. The S.T.B. does not claim that these figures are particularly accurate and a new survey is currently being conducted by Industrial Market Research in Dundee. The Dundee Chamber of Commerce carried out a reconnaissance survey in March 1968 into hotel usage which showed 50% occupancy in Dundee and 40–45% in Tayside generally, based on returns from 231 hotels.

12. No information showing the effect of winter sports development on winter employment in Perthshire is available, but the effect of the Glenshee developments is noticeable in Blairgowrie where hotels are being extended and modernised on the strength of the winter demand. Pitlochry is not perhaps close enough to either Glenshee or Speyside to benefit significantly from winter sports.

13. Demand in the summer frequently doubles the resident population of a resort and it has been suggested (App.1.4 and 1.5) that this total can be doubled again when day visitors are taken into account. This affect is evident at Pitlochry and in Fife. Extreme seasonal fluctuations of demand are general throughout the Region but there are differences between areas in regard to the type of holiday provided and the type of holidaymaker served. The coast attracts the more static holidaymakers, almost half of whom come from the Central Belt of Scotland and 83% for their main holiday. Inland Perthshire by contrast attracts people from wider origins and caters more for the mobile tourist (App.1.2 and 1.6).

Future trends and opportunities

14. The increase of affluence, leisure time and personal mobility, which lie behind present trends in recreation, may be expected to step up the demand for annual holiday and second home accommodation (App.2.1 to 2.4). An estimate by Burton and Wibberlay (App. 1.7) is that there will be a doubling of day trip and annual holiday activity by 1985. At present the bulk of this demand focusses on the coast (surveys by the British Travel Association showing that up to 70% of all holidaymakers take part of their annual holiday by the sea). This is a national figure and there is no way of knowing whether it is applicable to Tayside residents, many of whom already live by the sea or near it, or what proportion of the demand from elsewhere will be likely to come to Tayside's coastal resorts.

15. While a great deal has been written about the expected increase in car ownership, real growth in the national income is proving to be slow enough to leave a large section of the population still dependent on the traditional type of holiday. It is expected that in Fife (App.1.5) there will be a steady change in the type of accommodation demanded, with on the one hand a switch from board in private houses to more expensive hotel and guesthouse holidays, and on the other hand an increase in the footloose holidays afforded by motels, caravanning, camping and touring.

16. The suggestions in the final section of this chapter for recreational facilities would provide for the needs of many of the increased number of tourists that are likely to come to Tayside. The scope of these needs may not be shown completely by the scanty information available. All that can be said is that more tourists come to the Region than are catered for at the moment and that this shortfall will be intensified by the national population expansion, so that it is unlikely that the proposals are too far-reaching — rather that there is going to be difficulty in matching supply and demand. To some extent supply stimulates demand so that the more that can be done to improve facilities the greater the share of the passing tourist traffic Tayside can expect to enjoy.

THE DAY TRIP

17. Discussion of tourism centres on the question of accommodation, as it is the need for somewhere to stay overnight which distinguishes the tourist from the resident in regard to the facilities required. As the expected rise in the standard of living and the planned increase in Tayside's population take place, the relative significance of incomers for recreation will decline. The emphasis will be on the provision of facilities to meet the requirements of the day tripper who, if a resident, will be operating from his home, and, if a tourist, from his hotel, but who will be demanding substantially the same kind of facilities. The tourist will usefully spread the demand away from the weekends and into the mid-week. It is the day trip aspect of recreation and holidaymaking alike which gives rise to the most acute planning problems and which is mostly in need of analysis.

Non-Car-Owners

18. People, without cars must perforce stay near to railheads and bus routes when taking their annual holiday and on any day trips for recreation throughout the year. To cater for this need a wide variety of attractions is required within close reach of one another and these have been traditionally found in the holiday 'resorts' which are commonly small coastal towns, or more recently in holiday camps or parks like Craigtoun in Fife.

19. The Aviemore Centre was developed with 'après-ski' and summer holiday use principally in mind but it is noticeable that the concentration of attractions there is making it also a goal of the day-trip coach from the cities, the visitors staying mainly within the centre during their comparatively short stay and having little contact with the surrounding countryside directly.

20. The importance of provision for public transport-using day trippers should not be overlooked as they still form the bulk of our population and will by definition have greater difficulty than the car-owners in finding outlets for recreation outside the city in an age of shrinking rail and bus services.

21. The traditional coastal resorts will no doubt continue to provide for this need but we must turn to the Country Parks section of the Countryside Act, 1967 for the satisfaction of the new demands which will arise as the population increases. However only a proportion of the increase will be car-owners, so that further detailed consideration of the role and capacity of the traditional resorts will be required.

Pleasure-drivers

22. Car-owners, although fewer in number than the non-car owners at present, raise more difficult problems now and in the future when they will be much more numerous. Not only does the car open up a new range of possibilities for recreation but it stimulates the appetite for day trips. The BTA estimate that on August Bank Holiday 1965 39% of car-owning families made a day or half-day trip while only 23% of non-car-owning families did so. Information from BTA and STB studies suggests that the car is becoming the principal mode of travel for visitors and day-trippers, and this can be taken as the basic assumption in considering the future pattern of recreation in Tayside.

23. Enough evidence exists to allow a broad guess at the future increase in day-trip cars in Tayside. The table at Appendix 2.5, which summarises the calculations, shows that there are about 30,000 cars travelling in peak periods for recreation purposes within the Region at the present time. On the basis of the generally agreed forecasts of increasing car ownership, and on the assumption that driving for pleasure will increase accordingly, the amount of recreational traffic might be three times as great by the 1980s and possibly eight times as great by the end of the century.

24. It must be stressed that this forecast is based on elaborate assumptions and that many events could prevent such a great increase in recreational traffic. The fundamental decision is the level of demand to be provided for; clearly it may not prove possible to provide fully for future peak traffic. What is clear is that a large increase is to be expected over the next 10 years even without any large growth of the Tayside population, and, therefore, an immediate programme is required for providing parking and services in country areas.

25. From several surveys there appears to be the tendency for pleasure drivers to make only relatively short trips. Bearing this in mind and observing the present distribution of facilities and the problems which are beginning to arise, it is possible to form an idea of the pattern of day-trip recreation today and to make some estimates of the physical requirements to accommodate its expansion in the future.

Present pattern of day-trips

26. The impact of the day-trippers on the countryside is increasing rapidly. Although no comprehensive parking surveys have been carried out it is clearly difficult to find parking space at beaches, and there is some congestion in the glens and on loch sides where people have habitually been able to get off the main road into open country.

27. Some landowners are being forced into restricting public access because of the increasing numbers of people. The surprising thing is not that these irritations occur and that some roads are overcrowded, but that 30,000 cars can be accommodated in the countryside, considering that the provision for the car-borne visitor is so slender.

28. A rough estimate of the official and unofficial parking places in which a day tripper can stop can be made as follows:

(a) Car parks and kerbside parking in country towns and villages;

(b) Private estates and buildings open to the public;

(c) Golf courses and parks, such as Craigtoun Park;

(d) Public car parks at beaches, at the Queen's View, at Glenshee and in association with National Trust and Nature Conservancy properties;

(e) Casual parking on farm access roads, county road verges, Forestry Commission roads, corners of wasteland, in private woodlands and on the foreshore.

29. In comparison with the number of day-trippers, the provision of parking spaces for the above categories is negligible, the only substantial opportunity for parking now open to the day-tripper is in car parks and kerbside parking in towns and villages.

30. The impression is that most of the people who go for a drive in the country keep on the move while in the countryside proper, and only stop in the towns and villages and at hotels for refreshment. An example of this, backed up by some figures, may be taken from the coastal situation in the area. A traffic survey on main roads in 1965 suggested that about 7,600 cars were driving along the coastal strip in the Tayside Area for pleasure on August Sundays (app.1.8). Analysing the car parking opportunities on the rural parts of the coast it is clear that even utilising all official and private accesses to the full, the number of cars which could be accommodated would probably not exceed a few hundred and certainly did not reach one thousand, which would suggest that many cars gained access to the coast within the coastal towns and villages. It is a matter of speculation how far this pattern of behaviour is from choice and how far from necessity.

31. Taking into account the existing congestion in such small towns as Elie it is clear that even the short-term forecast of a threefold increase in recreational traffic could not be accommodated in the towns and villages unless these are redeveloped out of all recognition. Recreational activities of car-owning day-trippers is still largely based on the facilities of the resort towns which catered for almost the whole market before the advent of car-ownership made any other arrangement possible. These towns must continue to provide for annual holidays and for outings by the non-car-owning population which implies action to preserve their character, and further action to divert some of the pressure by making more provision for day-trip traffic in the countryside and on the coasts.

32. Greatly expanded car parking provision will be required in the countryside of Tayside by the end of the century even without any large growth in the Region's population. The demand is likely to be so great that it may be necessary to regularise parking and access on every minor private or public road leading to hills or sea if greatly increased public nuisance is to be avoided. The Countryside (Scotland) Act 1967 encourages local authorities to make the kind of provisions necessary, and proposals for action under the terms of the Act are made in the final section of this chapter.

PRESENT ACTIVITIES AND FUTURE POTENTIAL

33. In this part we summarise our survey of the existing main outdoor recreation facilities in the Region and the assessment of the potential for future expansion. The areas referred to are included in the resources and facilities indicated on Diagrams 12 and 13.

34. Most studies have estimated that in terms of recreational activity Britain is following the trends in the United States so that the general implications of American research into recreational habits, noted in Appendix 2.2 to 2.4 may be taken as some guide to what might happen in this country.

35. One notable tendency has been for the individual pastimes in the United States to increase proportionately in popularity at the expense of spectator sports and team games. In Britain rapid expansion is taking place in the activities of gliding, ski-ing, climbing, golf, archery, riding, fishing, boating, water ski-ing, canoeing and perhaps most dramatically of all sailing. While expenditure on cars and motor cycles increased by 600% between 1952 and 1962, that on sailing activities increased by 1,200%.

36. It will be noticed that the last five of these activities listed as rapidly expanding in Britain are concerned with water, and this explains our emphasis, in the section on guidelines, on the coast, the lochs and the rivers. This attraction towards water for recreation is a world-wide phenomenon and appears likely to intensify rather than to diminish. Tayside, it will be seen, is very well endowed with suitable water resources for recreation purposes and can be expected to attract many visitors from outside the Region on this account as well as being able to satisfy the growing demands of its own population.

37. The major conclusion of the American research is that while the population of the United States would double by the end of the century the demand for outdoor recreation would treble. It is suggested that although the population increase here will be less, a similar trebling should be assumed in this country in the absence of any detailed studies which could provide a more precise figure. Statistics relating to the general growth of recreation demand can be found in Appendix 2.

Golf

38. With championship courses at St Andrews and Carnoustie, and with 95% of the population living within 6 miles of at least one course, golf is superlatively well provided for on Tayside. Some 55 courses give a provision of 5,000 persons per 9 holes. This compares with the average English provision of 26,000 persons per 9 holes.

39. The wide appeal of golf is reflected in the rapidly increasing participation. There are estimated to be ¾ of a million golf players in Great Britain and more people wish to take up golf than any other sport. In Tayside it is probable that many clubs could increase their membership with no lowering of standards. Even if no more courses were constructed the ratio of people to number of holes would by the end of the century still give a higher standard than the better English counties enjoy today.

40. The wide choice of generally uncrowded golf courses is a fine asset and of major promotional significance for the Region. It would therefore be wrong to conclude that the present golf courses are sufficient to accommodate all the demands of the existing or an increased population. Land is available for further coastal and inland courses and opportunities should be taken to set aside the ground and to undertake construction as the need arises.

Fishing

41. After gardening, fishing is the most popular pastime in Britain with over 3 million people taking part. The general impression is that a higher proportion of people in Scotland fish than in England. Only tidal waters can be fished by the general public, elsewhere the right to fish belongs to the riparian owner and written permission for salmon fishing must be gained from the proprietor, who may be the estate owner, an hotel, a fishing association, the Forestry Commission, Electricity Board of a county or burgh council. The publication *Scotland for Fishing* gives many fishings available to the public and although these are extensive the demand for more water to be available to the ever-growing numbers of anglers outstrips the supply.

42. The Hunter Committee reporting in 1965 recommended that Area Boards should extend the scope of the present Fishing Associations and should have powers to develop the sport in Scotland. In Tayside there is capacity for further growth of the sport but extension can only take place by establishing detailed policies for each water area.

Sea Angling

43. In 1968, 7 out of the 34 Scottish sea-angling clubs were located in Tayside. One of the most enthusiastic of these is at Tayport while Anstruther, Dundee and Arbroath have drawn national interest to their festivals. In addition fine sport is reputed to be available from many other places on the coast.

44. Further opportunities exist all round the coast for land-based and boat fishing. The day-trip potential of the specific sporting holiday attraction could bring many more people to the coast which would aid in extending the season beyond the summer months. While all the settlements could increase their facilities, Anstruther and Teyport have most potential for development as well as the enthusiasm required to create notable centres. Instruction facilities would be required and an improvement in quality and quantity of boats would be necessary.

45. As an alternative to the excellent sport offered by salmon and trout, coarse-fishing could become a major activity. The potential in Tayside is virtually unexploited and two things render the possibility more attractive. Coarse-fish are at their best when salmon and trout are out of season and there is no closed season for coarse-fish in Scotland. A recent survey showed that only 10 per cent of a number of interested parties questioned had any worry that coarse-fishing expansion might endanger the salmon and trout, and almost 50 per cent showed active interest in the possibility of exploiting coarse-fish. Already the Forestry Commission have agreed to open some of their lochs for this purpose.

Sailing

46. Sailing is one of the fastest growing leisure activities, participants increasing from 30,000 in 1949 to 500,000 in 1964. On Tayside the majority of the 11 clubs affiliated to the Royal Yachting Association are situated along the coast and in the Firth of Tay, but several of the large lochs and numerous small ones also accommodate thriving clubs. In addition there are many small clubs and casual users.

47. While the North Sea coast cannot match the excellent conditions offered on the western seaboard, especially for cruising, the rising popularity of this sport suggests that Tayside has an important part to play in satisfying general demand. There are no unusual hazards along the coast but conditions for sailing on the lochs are considerably better since there are no tidal problems and extreme weather conditions are less frequent. In both locations the pressure on mooring and slipway facilities is high in the height of summer and conflict with other water users often imposes further restrictions.

48. Tayside has an excellent supply and diversity of water facilities and with a careful selection and control future demands should be readily met.

Power-boating and water ski-ing

49. Demand for space for power-boating and more particularly for water ski-ing is increasing. Loch Earn forms the focus with three clubs using its waters, while on the coast Tayport has a thriving water ski-ing club. The major problems of speed, wash and noise make other recreation seekers loath to associate with the power-boater and water skier. The threat to wild life and the annoyance to anglers, swimmers and others are accentuated in narrow stretches of water. There is also the danger element which accompanies rapid movement in inexperienced hands.

50. Physical conditions ideal for water ski-ing, little wind with minimal wave interference, are found in many of the smaller lochs, at the western end of the larger lochs, and along the sheltered sections of the coast. Physical opportunities are more severely limited by the conflict with other users. Further development can be accommodated provided there are careful zone restrictions and policies can isolate the activity to certain locations. Organisation will become vital as intense use becomes the rule rather than the exception. A description of the problems which have arisen at Loch Earn is to be found in Appendix 2.6.

Coastal recreation

51. There are many popular beaches along the coast, some of which have a backing of sand dunes which are attractive for picnics and sun-bathing. In many cases access is from one point only and already on a fine weekend beaches become crowded at these points. People do not walk far from their cars and this creates a considerable parking problem. While some beaches are unsuitable for development others could with more parking provision take many times their present numbers. For example, at Lunan Bay the sands could accommodate 1,300 people with an area 100ft by 100ft per family; with 50ft by 50ft per family 5,200 people could be accommodated. This number of people would, however, require at least 15 acres of car parking and at isolated beaches such as Lunan Bay parking space will be the ultimate control of capacity. The small bays of Fife offer, because of physical restriction, less promise than the more extended stretches of sand, while the potential fire danger at Tentsmuir and the disturbance to wild life at several locations are limiting factors. The stretches of sand with the greatest potential for dealing with an increase in demand are Largo and Shell Bay, Barry Sands, Elliott Links, Lunan Bay and Montrose Sands.

Ski-ing and winter sports

52. The popularity of ski-ing has increased manyfold in the last decade and, although it is still a relatively expensive sport, the proximity of reasonably good conditions to the population of the region and the Central Belt appears to have been a major factor in the growth of the sport. The pressure is likely to increase and the problems created will be considerable since in this area demand will continue to be generated by day visitors and concentrated at weekends. A full study of the potential of the area is given in the Cairngorm Report (App.1.9). Proposals to improve the access road, car park and general facilities are already advanced for the Glenshee area and a village development has been suggested around the Spittal for the accommodation of visitors and diverse sports facilities.

53. The Region is well placed for access to all the ski-ing centres of Scotland as well as to the general

slopes for casual use. Expansion of all these facilities would therefore be of great benefit to those living within the Region.

Other activities

54. The Region has many and varied routes for the walker – through mountainous country, or through the Angus glens or along the coast. Short tracks along the coast could be joined up, while a demand is likely to grow for short signposted footpaths starting and returning to car parks and roadside halts.

55. Other activities which are possible in the more remote areas include mountaineering, shooting, orienteering and pony-trekking. All these are capable of further development.

56. Increasing affluence and rising car-ownership may well bring with them a growing interest in motor sport. The availability of permanent tracks for the various types of motor sport would be a great asset to the area. Careful selection of sites will be required but such is the diversity and space in Tayside that no difficulty is anticipated in accommodating this sport.

GUIDELINES FOR THE FUTURE

57. From the discussions of tourism, the day-trip and the individual sports and recreation activities in the first three sections of this chapter the principal objectives of a recreation plan can be seen to fall under four main headings:

(1) To prepare a new zoning plan for the coast and to reconsider policies for the principal lochs where conflicts are likely to arise.
(2) To zone areas for the development of tent sites, caravan sites, chalets and second homes which will be required as holidaymakers become more affluent.
(3) To make provision for driving for pleasure in the countryside not with new roads but with better roadside reception in the form of Country Parks and roadside halts.
(4) To support and guide the improvement and expansion of the various sporting interests and recreation activities already in being in the area.

58. In some cases proposals can be readily mapped in which case they are shown on Diagram 13, in other cases it has only been possible to state what the intention is and to rely on further study or the turn of events to suggest where and how they should be implemented.

The coast

59. Three centres suitable for intensive development can be identified on the coast at Barry Links and Montrose Basin in Angus, and Largo Bay with Shell Bay in Fife. They could be of different character to suit a variety of demands but they could all come under the heading of Country Parks. Opportunities may also arise for the creation of Country Parks on inland sites but the location of these will be more dependent on suitable sites or estates coming on to the market. When this occurs further consideration should be given to the suitability of each potential site for a Country Park. On the coast, however, there are clearly prime opportunities which should not be lost.

60. At Barry Links there is an area of flat low-class agricultural land amounting to 2,500 acres in the ownership and use of the Ministry of Defence. The public are at present excluded and the Ministry of Defence have indicated their continued use of the whole area. If at any time in the future, part or the whole of the area should become available for other uses, priority should be given to the phased development of this strategic coastal site for recreational purposes. With 5 miles of sandy beaches, its location relative to the proposed distribution of population is ideal. By the end of the century some 400,000 people could be living within 10 miles of it with ready access by public transport.

61. While some of the other proposed centres can be developed only for certain purposes, at Barry Links there would be ample space for swimming, golf, riding, walking and other pursuits for large numbers of people without crowding or creating a parking problem. While the main provision could be for outdoor recreation, there is no reason to exclude gymnasia, squash courts or any other buildings for covered sports. What is envisaged here could be one of the finest sport and recreation centres with a full complement of supporting services.

Inland waters

62. Various types of recreation have been allocated to inland waters in the Perth County Development Plan. The particular problems experienced at Loch Earn have been described in Appendix 2.6. They are likely to be experienced on other lochs if plans are not drawn up in time.

63. There are as yet no specific proposals for Loch Earn, although the Loch Earn Users Association has asked those in control of high speed boats not to drive at speed or to tow skiers round the islands; there is often no boating on Sunday mornings and no power-boating during church services. Suppressors have been fitted to all permanent power-boats, although in general the noise has not been a great problem since there is a high incidence of background noise from cars close to the loch.

64. Ideally a plan for the loch would zone motorised sports at the western end, canoes in the central part, and sailing in the east. This spatial zoning could possibly be complemented by some form of time separation giving anglers, for example, a chance to fish in peace and quiet at certain times during the week when no boating would be allowed. However the amount of capital already invested could make this difficult to achieve, for although the sailing activity tends to concentrate at the eastern end of the loch, power-boating and water ski-ing are well established at both extremities and resiting could prove costly and difficult. It may be possible, however, to guide casual users to those parts to launch their various craft under the auspices of the organisation. Slipways and car parks should be developed to spread the pressure, and boat access to certain illegal launching places curtailed – for example on the south side near St Fillans.

65. It is clear that segregation is the most effective way

of reducing friction between the different sports as well as increasing the density of use. If it is decided that the capacity of the loch is to be exploited to the utmost then zoning will have to be enforced as pressure mounts.

66. While no other Tayside loch is approaching the degree of use on Loch Earn, demand is rising on both Tay and Tummel, the next most accessible waters. Taking the example of Loch Earn as a forerunner to their situation, therefore, it would appear to be necessary to prepare outline zoning plans at an early date if the full potential of the lochs for active use is to be realised. In particular we recommend that the Local Authority and the Countryside Commission should consider asking for the designation of Loch Earn and Loch Tay as areas of special planning control.

67. The following zonings appear to be desirable for power-boating and water ski-ing:— South-west end of Loch Tay, Dunalastair Reservoir, Glen Lyon Reservoir, the North end of Loch Faskally, and, possibly, Butterstone Loch. The Loch of Craiglush is zoned by the county for motorised water sports but this would appear to conflict with wildfowl interests.

68. The Backwater Reservoir and Lintrathen Loch should be the subject of a further study to determine the degree of public recreation which will be compatible with their water supply and wild life interests. In general where reservoirs for public water supplies are suitably situated for recreational purposes the possibility of adding filtration plants to make this possible should be considered.

General recreation in the countryside

69. All recent studies have forecast increasing demand for caravan sites and second homes (App.1.13), and while it may be possible to accommodate many of these in or adjacent to towns and villages, this is unlikely to meet all needs, and beyond a point may be damaging to the settlements. It is, therefore, necessary to consider how and where sites could be provided in the countryside to limit the effects on amenity.

70. The first places to be considered should be around the coastal areas and inland lochs listed earlier as potential sites for recreational development. In general these areas offer the possibility of absorbing the development into the countryside in pleasant surroundings. They are in any case likely to need a certain amount of development to equip them for water sports, and by grouping caravan sites, camping sites and chalets around these places it should be possible to prevent sporadic development in other parts of the countryside. There may, however, be secluded positions where a small development could be sited without detriment to any other interest, and the kind of study referred to in paragraph 79 below should reveal these.

71. Subject to more detailed studies by the Planning Authorities the following would appear to be appropriate locations for caravans and chalets:— Glen Ulg, Glen Prosen, Dunalastair Reservoir, West end of Loch Tay, Loch Earn, Glen Quoich, Glen Lyon, Largo Bay, Barry Links and the Pittenweem—Anstruther coast.

72. The numbers of people expected to be visiting the countryside for pleasure by car could be so great that it is impossible to present a plan in this report which could show exactly where they could be accommodated. Country parks and roadside halts for motorists with opportunities for access to land sufficient to get away from the public road will be the principal means of providing for this need.

73. There are no properties away from the coast which have such obvious merits as Country Parks that we would feel justified in suggesting them by name Should suitable properties come on the market the opportunity should not be lost to create Country Parks, but these are unlikely on their own to meet the need for extended access to the countryside and we think that this problem is sufficiently important to discuss the requirements for roadside halts in greater detail, as at least in the short term, they will be urgently needed.

Roadside halts

74. Perth County has had a programme for the provision of roadside halts under consideration for some years but finance has only been available for the first one which is at the Queen's View on Loch Tummel. This is a car park for 40 cars, with lavatory and shop adjacent to the famous view over Loch Tummel and the starting point for a number of walks through the adjacent forests.

75. Other sites in Tayside which the County Planning Authorities have had in mind for rural parking are:— Kingsbarns, Auchtermuchty Common, Cults Brae, Dura Den, Craigmead — Lomonds, North Fife Hills between Brunton and Gauldry, near Lindores Loch, North side of Loch Rannoch, General Wade's Stone or County Boundary, Devil's Elbow, and Norman's Law, Largo Law and West and East Lomond (viewpoints with car parks).

76. The programme for roadside halts will need to be greatly increased, and while our studies indicate some appropriate sites a general survey is required throughout the Region. Accommodation, for the motorist may be required on any part of the Region, but as a first priority the areas within e short distance of the main urban population on the main road network should be examined Places where congestion is already building up should also receive early study.

77. The aim of a programme of this kind should be to find a way in which people may be encouraged to stop their car and enjoy the countryside in conditions and locations which will prevent any disruption of existing land uses and rural interests. In some places it may be possible to link the stopping place with a walk or fishing or some other activity; in other cases provision may be limited to a halt where it is possible only to picnic and admire the view. In some cases stopping areas may be manned and charges levied, but this will not usually be possible.

78. There are many alternative ways of designing stopping places for the pleasure-driver, but a basic feature is the provision of a public lavatory. This is a costly item and to justify its expense it must serve

approximately 100 car parking spaces. With provision for picnicking etc., a site of this size with permanent services will need about 5 acres.

79. As an example of the analysis and design which is appropriate, studies were made of the ways in which visitors by car could have access to the countryside in Glen Clova and in an upland area near Dunkeld (App.1.14). The latter area is a typical piece of hill country on the southern edge of the Highlands and contains a number of tracks ending in interesting open country suitable for casual walkers and horse-riders. Glen Clova is typical of the Angus glens, which are already showing signs of some congestion and conflict as a result of increasing recreational traffic. It is not suggested that these particular areas should be singled out for development. The purpose was to show the kind of survey which should be undertaken in any area where day-trip traffic is rapidly increasing.

80. From these detailed local studies and our estimate of potential future traffic it would appear that there will be a need for at least 500 new parking spaces per year in the countryside. This would provide for only a small part of the peak recreational traffic, and assumes, therefore, a fairly high turnover of cars in the parking areas. Further studies are required to check turnover rates and parking habits, and the estimates should be reviewed as new information becomes available. At present it seems essential to aim at a fairly high level of provision to catch up with the demand and the figure of 500 new parking spaces per year is put forward as a measure of the size of programme required for at least the next 10 years.

81. Landowners in Tayside have shown an awareness of the problems of recreational traffic and an interest in the sample studies which have been carried out. However, the initiative in providing rural parking areas lies with the local councils and other public authorities such as the Forestry Commission, Water Boards and Countryside Commission, and it is to be hoped that they will be able to investigate the problems of design, maintenance and servicing which arise in this field.

82. The precise siting of rural parking areas is a matter for detailed local study, and the regional maps in this chapter do not make specific suggestions in this respect. However, they do show large areas which are comparatively remote from any form of development, and it is highly desirable that the present character of these areas should be preserved. This implies limitations on the spread of development away from the existing roads, and a reassessment of the intention to build new roads through Glen Tilt and across Rannoch Moor. Access agreements should be made, however, to enable pedestrians and horse-riders to enjoy these areas without detriment to farming and sporting interests.

83. The proposals on Diagram 13 include a long-distance footpath along the coast where many short lengths might be joined up into a continuous system. Much more important are short-distance footpaths from car parks, which should be planned in conjunction with roadside halts wherever adjacent land uses permit. The need for these footpaths should be an important factor in the choice of suitable sites for halts.

SUMMARY OF CONCLUSIONS

84. One of Tayside's greatest assets in competition with other regions is the recreational potential of its rural landscape, coastline, rivers, lochs and uplands. It is in the interests of the development of the Region to make use of these resources for recreational purposes, and this requires coordinated programmes for conservation and development.

85. With increasing car-ownership, day-trips for recreational purposes could treble by the 1980s and continue to rise to the end of the century. Pleasure-driving on this scale would make a heavy impact on the countryside and create an urgent need for services and facilities.

86. To provide for this possible level of recreational traffic new car parking spaces in the countryside for at least 500 cars should be considered an annual target until at least 1980.

87. In selecting locations for these new country halts local surveys will be necessary to ensure that the interests of the landowner and country-dweller are not harmed by increasing the facilities for public access and enjoyment.

88. Diagrams 12 and 13 summarise the main resources and possibilities for recreation. Together with the County Tourist Plans these provide a starting point for more detailed studies by the local authorities and recreational bodies, and the aim should be to prepare comprehensive recreational plans and implementation programmes for each part of the region. In this process the following areas should be investigated as potential locations for coastal parks:— Barry Links; Montrose Basin; Largo Bay/Shell Bay; Montrose Sands; Lunan Bay; West of Arbroath; East of Crail.

89. The following inland waters require carefully considered development plans:— South-west end of Loch Tay; Dunalastair Reservoir; East end of Loch Lyon Reservoir; North end of Loch Faskally and Loch Earn.

90. Further provision should be made for sailing and fishing on suitable lochs, rivers and coastal areas.

91. Consideration should be given to providing areas for tents, caravans and weekend chalets in the following areas:— Glen Uig; Glen Prosen; Dunalastair Reservoir; West Loch Tay, Glen Quoich; Glen Lyon; Largo Bay; Barry Links, Pittenweem; Anstruther.

Appendix I to Chapter 10

REFERENCES AND SURVEY MAPS ON RECREATION AND TOURISM

1.1 County Tourist Development Plans for the Counties of Perth, Fife and Angus.

1.2 Scottish Tourist Board Annual Reports 1967 and 1966.

1.3 *Where to stay in Scotland,* Scottish Tourist Board, 1969.

1.4 *A Study of the Tay and Tummel Valleys with special reference to Pitlochry,* School of Architecture and Planning, Duncan of Jordanstone College of Art, Dundee, 1967.

1.5 Fife County Development Plan.

1.6 *Summer Tourism Study,* Scottish Tourist Board, 1969.

1.7 *Outdoor Recreation in the British Countryside,* T.L. Burton and G.P. Wibberley, Wye College, 1965.

1.8 *Trunk Road Census,* Scottish Development Department and Ministry of Transport, 1965.

1.9 *The Cairngorm Area,* Scottish Development Department, HMSO 1967.

1.10 *California Boating Plan, 1964,* Division of Small Craft Harbours, March 1964.

1.11 *Recreation Plan, 1966,* State of Wisconsin, Department of Resource Development.

1.12 *Boating in Wales,* R. Jessop unpublished MA thesis, University of Manchester, 1967.

1.13 J. Barr, 'A Two Home Democracy', *New Society,* 7 September 1967.

1.14 Working Paper for Tayside Study by David Skinner, Consultant Landscape Architect, 1968, *A Study of Recreational Opportunities in Two Areas in Tayside.*

1.15 The following maps were prepared at ½" scale of the main physical assets of the area:

Map No	
1	River systems and lochs
2	Forestry Commission lands
3	Woodlands
4	Types of farming
5	Landscape — topography, and special areas mentioned in the Tay Valley Plan
6a & 6b	Physical nature of the foreshore and coast.

Existing policies and proposals for recreation relating to the area were shown on further overlays (Maps 7–11):—

Map No	
7	County Tourist Survey and Proposal Maps (1" scale)
8	Areas of Great Landscape Value as defined by the Counties
9	Sites of Special Scientific Interest and Nature Reserves
10	Water catchment areas
11	Land interests — particularly along the coast.

Existing activities and conditions which might affect recreation were shown on Maps 12–30:—

Map No	
12	Quality of agricultural land in lowland areas
13	Vulnerability to public pressure of S.S.S.I.s (and some other areas)
14	Educational potential for nature study
15	Lowland lochs — existing use
16	Lowland lochs — surrounding land use
17	Lowland lochs — potential
18	Highland lochs — existing use and potential
19	Access — classified roads and tracks
20	Accessibility and remoteness
21	Road ends map (1" scale)
22	Properties allowing public access
23	Walks, bridleways and golf courses
24	Abandoned railways, ownership etc.
25	Caravan and camping sites
26	Accommodation
27	Routes taken by bus tours
28	Coastal Study Maps (a) Physical (b) Potential of beaches (c) Land interests (d) Scenic routes and viewpoints (e) Existing development policies (f) Accessibility — roads (g) Accessibility — distance from roads (h) Traffic (i) Accommodation
29	Estate ownerships and boundaries
30	Time/distance diagram of car travel from main development area

Appendix 2 to Chapter 10

BACKGROUND STUDIES OF RECREATIONAL DEMAND

2.1 FACTORS INFLUENCING DEMAND

Research into recreation motivation and demand is still in its infancy in the UK and it remains necessary to draw on the vast amount of data compiled by the Outdoor Recreation Resources Review Commission whose 26 volumes on *Outdoor Recreation in America* completed in 1962 remain the source of much basic information.

The American experience is recognised as preceding our own position by about a decade — and while it is unlikely that our course will exactly parallel that of the USA many pointers suggest certain trend similarities.

The major conclusion of the ORRRC was that while the population of the USA would double by the end of the century, the demand for outdoor recreation would treble. Michael Dower in the *Fourth Wave* (a Civic Trust Survey 1965) suggests that until a similar study of leisure growth has been made in Britain, the assumption must be made that demand here may also triple as the result of a population rise of one-third — a considerably more dramatic growth than in N America. The ORRRC quotes the basic factors influencing demand as being (1) population, (2) age, (3) income, (4) education, (5) mobility, (6) free time of adults, (7) occupation, (8) place of residence and (9) opportunity. Global projections of future demand for outdoor recreation draw heavily on these basic factors — their interaction and trends.

Population projections suggest that the population of Britain will increase from 52 million in the middle '60s to 62/63 million by 1985, and reaching 70 million by the end of the century: a 35% increase. As mentioned above the relationship between population growth and the expansion in recreation demand is not expected to be simple, the interplay of other factors is expected to accentuate the situation. In Tayside the following population expansion is envisaged.

1966	*1981*	*2001*
452,000	485,000–508,000	627,000–752,000

The *Age Structure* of the population has several important implications for leisure demand. After adolescance participation in active pursuits varies inversely with increasing age: some activities of a less demanding nature such as sightseeing and fishing tend to remain popular in all age groups, while participation in walking for pleasure actually recurs with age. Obviously retired people (Dower quotes a rise of 50% from 8m. in 1965 to 12m. beyond retiring age by 2000 in Britain) have more time on their hands, during which to attempt less physically exhausting leisure pastimes, while the young need very active recreational outlets, cycling, swimming etc. — both these sectors are expected to increase considerably in Britain. Population projections for Tayside suggest a large increase in the actual numbers of younger and middle aged population.

Real income has a considerable influence on recreation demand — participation tends to rise as spending power increases. Burton and Wibberley suggest that real income per head will rise by 75% to 1985 while Nicholl quotes a rise of 100% by the end of the century (see App. 2.2 for references).

Education seems to affect participation in a similar way — the more advanced the schooling the more frequently and the more active the sport pursued. This appears to hold true particularly with swimming, walking, organised games and driving for pleasure, where those having followed full time higher education courses exceed the national participation level considerably and increasingly with every added year. In this country projections to 1985 suggest a rise in full-time places in higher education of 220% and by 2000, 300%.

Mobility appears to be primarily geared to the possession of a car, and the growing tendency is for the car to be an instrument for leisure. The projected rise in car ownership in this country can only be described as phenomenal with an expected 30 million cars on the road by 2000. There is a strong correlation between car ownership and short period recreation demand. National surveys by the BTA (formerly BTHA) at Whitsun 1963 and August Bank Holiday 1965 show the proportion of families making trips:

	1963 Whit		*1965 August*	
	Car owning families	*Non car owners*	*Car owning families*	*Non car owners*
Staying away from home	14%	8%	26%	10%
Day/½ day trip	30	14	39	23

Taking 1965 figures we see that 62% of all families made a day or half day trip and while noting that this was likely to be one of the busier weekends, being a Bank Holiday, it is probably reasonable to assume that by the 1970s this will prove the average rather than the exception.

An analysis of traffic census figures along the Tayside coast trunk routes (1965) and Class 1 routes (1963) reveals the dramatic winter/summer and weekday/Sunday extremes of road use. Near Largo Bay for example car numbers treble from a winter to a summer Sunday, while the increase from a summer weekday to a Sunday amounts to about 30%, complementary to this there is a trebling of the number of buses. At first glance this may not appear as dramatic as suggested until one realises that virtually all the Sunday traffic will be in search of recreation. It is also worth noting that even the winter Sunday traffic is always in excess of that on weekends.

Although there are no comprehensive car parking statistics for the rural areas the general situation is clearly one of extreme congestion in most areas even on mediocre weekends. 'No-parking' restrictions to facilitate through movement of traffic now abound in many small settlements – accentuating the problem for stopping traffic.

Free time and Occupation. The relationship here may not be with the job so much as the degree of the associated benefits – income and leisure time. However the ORRRC found that the professional enjoyed most outdoor recreation and the self-employed and the farm worker least. A reduction in the average length of the working week will obviously release more time for other interests, one of the most important of which is the recreation experience. Similarly as the average length of paid annual holidays increases so does the probability that longer duration holidays may be sought, together with a growth in second holidays and long weekend trips.

The trends on Tayside are expected to follow the national average in respect of working hours and annual holidays.

Place of residence appears to affect participation figures in the States; country and city dwellers spend less time in leisure pursuits than those with suburban homes. Little is known about this in Britain.

Opportunity is a factor of great importance linked with location and access. A point stressed by the ORRRC was that 'if the facilities are there, people will use them'.

TABLE 2.2 Possible future changes in factors affecting recreation in Britain

% change 1960/65 to:–	*1985*	*2001*
Population	+ 20%	+ 35%
People beyond retirement age	–	+ 50
Real income per head	+ 75	+100
Length of average working week	– 25	– 29
Average length of annual holidays	+100	+100
Cars per head	–	+150
Registed private cars	+290	+329
Pupils in schools	–	+ 67
Full time higher education	+220	+300
Over 15s at School and University	–	+115
Possible recreational demand	–	+200

Dower suggests a trebling of demand by the end of the century – *ie* a 200% rise; this very roughly means that for every 1% rise in population (35% by 2000) there might be a 5.6% rise in recreation demand.

Sources: D.C. Nicholl, *Future Development in Recreation in Britain,* Town Planning Institute Research Conference Paper, 1967.

T.L. Burton and G.P. Wibberley, *Outdoor Recreation in the British Countryside,* Wye College, 1965.

M. Dower, *The Fourth Wave,* Civic Trust, 1965.

J.C. Tanner, *Forecasts of Vehicle Ownership in G.B.* M.O.T. 1965.

TABLE 2.3 Estimated number of active participants in popular leisure activities in Britain, 1966

Rating	*Activity*	*Numbers Participating*	*Expected Rate of Growth*	*Source*
1	Fishing	3,000,000	1	Combined information from Anglers Co-op. Assoc., Nat. Fed. of Anglers & Salmon & Trout Assoc.
2	Organised Walking and Rambling	960,000	2	Stayed at Y.H.A.s for this purpose.
3	Golf	750,000	1	C.C.P.R. estimate
4	Boating	700,000	1	R. Jessop (M.A. Thesis) based on R.Y.A. figures and fieldwork.
5	Amateur Football	650,000	2	H.M.S.O. Pub. British Life.
6	Hunting (inc. followers)	420,000	2	British Field Sports Society
7	Shooting	400,000	1	Licences issued by British Field Soc.
8	Ski-ing	380,000	1	Nat. Ski Federation of Britain
9	Rugby Union	300,000	2	Estimate based on R.F.U. material.
10	Cricket	250,000	2	Estimate based on M.C.C. material.
11	Tennis	200,000	2	Estimate based on L.T.A. material.
12	Riding	150,000	1	British Horse Society
13	Athletics	100,000	2	Amateur Athletic Assoc.
14	Water Ski-ing	75,000	1	British Water Ski-ing Fed.
15	Hockey	60,000	2	Hockey Assoc.
16	Mountaineering	50,000	1	New Society estimate, April, 1965.
17	Rowing	45,000	1	C.C.P.R. figure, with allowance for casual amateurs.
18	Club Cycling	40,000	3	British Cycling Fed. and Cycling Touring Club.
19	Model Railway Enthusiasts	40,000	2	Daily Telegraph Survey, November, 1966.
20	Canoeing	35,000	1	British Canoe Union & Canoe Camping Club.
21	Gliding	20,000	1	British Gliding Assoc.
22	Motor Racing	15,000	1	New Society estimate, April, 1965.
23	Archery	10,000	1	Daily Telegraph Survey, April, 1967.
24	Skin Diving	6,000	1	Members British Sub-Aqua Club.
25	Go-Karting	4,000	1	New Society estimate, April, 1965.

Key to Expected Rate of Growth

1. % rise in participation expected to be significantly greater than population increase.
2. % rise in participation expected to parallel population growth rate.
3. % rise in participation expected to fall below growth rate of population.

Sources: D.C. Nicholi, *Future Development in Recreation in Britain*, T.P.I. Research Conference Paper, 1967.

TABLE 2.4 Forecasts of recreational activity in America by 2001

% Change in Activity:—	*Low Estimate (note 1)*	*High Estimate (note 2)*
Driving for pleasure	154 %	184 %
Swimming	243	300
Walking for pleasure	177	—
Playing outdoor games or sports	251	281
Sightseeing	187	374
Picnicking	150	209
Fishing	100	—
Bicycling	98	—
Attending outdoor sports events	142	170
Boating other than sailing or canoeing	250	317
Nature Walks	169	—
Hunting	81	91
Camping	293	545
Riding	162	—
Water Ski-ing	384	476
Hiking	269	511
Attending outdoor concerts, drama etc.	232	271
All activities	184	228

Note 1. Assumes continuing 1960 quality and quantity of facilities available on a *per capita* basis.

Note 2. Assumes improvement of facilities.

Source: O.R.R.R.C., Outdoor Recreation in America 1962

TABLE 2.5 Possible trends of Recreational traffic in Tayside on peak summer weekends

		1966	*1981*	*2001*
(a)	Population in region	451,700	508,000	752,000
(b)	Household size	3.0	2.9	2.9
(c)	Households	149,700	175,000	261,000
(d)	Cars per head	0.149	0.33	0.42
(e)	Total cars	67,300	167,640	315,840
(f)	% car-owning households	40%	65%	85%
(g)	Car-owning households	59,880	113,750	221,850
(h)	% of (g) on recreational trips	40%	60%	80%
(i)	Numbers of (h)	23,950	68,250	177,480
(j)	50% of 2nd cars ((a) — (g))	3,700	26,940	46,990
(k)	Tourist cars from outside region	4,500	6,000	20,000
(l)	Total cars on recreational trips ((i), (j), (k))	32,150	101,190	244,470

Sources: Tourist surveys, Census reports, and projections of population and traffic — Chapters 11 and 22

2.6 RECREATIONAL ACTIVITY AT LOCH EARN

As an example of a rapid increase in demand and of the kind of problem which arises when a loch becomes popular, the situation at Loch Earn can be taken as an example.

The Loch is over six and a half miles in length and between a half and three-quarters of a mile wide, it has an east/west orientation and is beautifully situated between high hills with wooded slopes flattening to the water's edge. Only an hour's drive from Glasgow, the loch attracts large numbers of water users and spectators.

In 1950 there were only a few rowing boats on the loch and in that year a boating association was set up; this was followed by the first power-boats in 1955 since when there has been a rapid build-up of activity which has led to the setting up of the Loch Earn Users Association. The membership so far runs as follows:—

(a) Edinburgh Merchant Schools Adventure Training Centre. Set up in 1968 and eventually hoping to have their own boats.

(b) Hertfordshire Boy Scouts own the old station area where they pitch their tents and store their own boats.

(c) Loch Earn Sailing Club. One of the largest and most enthusiastic sailing clubs in Scotland with over 150 members and over 100 boats. In summer activities often take place twice a week.

(d) Loch Earn Sailing School, a long-established residential school with an international reputation.

(e) Lochearnhead Water Ski Club — one of the most successful clubs in Britain.

(f) Urgle Gurgle Water Ski Club — established in 1967.

(g) St Fillans Angling Association. Improvement of the fishing by stocking has met with little success. Attempts are being made to secure permit fishing rights from the landowners for local residents and day visitors.

(h) St Fillans Residents Association.

(i) St Fillans Power-Boat Club. Boats hired out.

(j) The larger riparian landowners who have always been very helpful in allowing scout camps etc on their land.

Members of the Loch Earn Users Association can muster almost 200 boats at the peak times, less than one-fifth being powered craft, providing active recreation for about 470 persons. The overall density of use at peak times is about one boat per 12 acres over the whole loch, but this is unevenly spread. Almost all the clubs are clustered close to St Fillans and over 80% of the activity is confined to some 1,000 acres in the eastern half of the loch. This gives a density of 1 boat to 6 acres. The most intense pressures are felt within an area of about 160 acres adjacent to the village and at peak times the density could be as great as 1 boat to 1 acre.

American studies have suggested densities of 1 boat per 12/15 acres (App. 1.10) and 1 boat per 20 acres (App.1.11) in coastal situations for all types of boating. The standard suggested for the coast of Wales is 1 boat per 5 acres (App.1.12). With regard to inland waters restricted to one type of boating, the densities tolerated can be very much greater. The following figures refer to sailing:—

Location	*Acres of Water*	*Boats*	*Boats/Acre*
Redesmare, Cheshire	25	50	1/0.5
Laigh Flash, Lancs.	160	180	1/0.9
Tatton Mere, Lancs.	52	38	1/1.4
Grafham Water, Hunts.	1,700	1,000	1/1.7

It would appear that, at a density of about 1 boat per 6 acres, when the activities are as diverse as experienced here, the congestion and conflict begin to indicate the necessity for some form of control. In general the experience of Loch Earn shows that any appropriate stretch of water within easy reach of large centres of population will become heavily used. On Lochs Tay and Tummel, the next most accessible waters, demand is already rising.

11 Population

1. The population of the Tayside Study Area was 452,000 in 1966 (Table 11.1). The Study considers proposals to expand this population by +175,000 to +300,000 by the year 2001. This Chapter considers these proposals in the light of demographic trends and prepares data for other sections of the Study. The principal sources of data were the following publications by the General Register Office:

(a) Annual Reports of the Registrar General for Scotland;

(b) Census of Scotland 1961: County Reports for Angus, Perthshire, Fife and the City of Dundee, Report on Housing and Households, Report on Migration, Report on Age, Marital Condition and General Tables; and

(c) Sample Census (Scotland) 1966: County Reports for Angus, Perthshire, Fife and the City of Dundee, Migration Tables, National Summary Tables.

In general, specific reference to these important sources is not made in the tables etc., included in this Chapter.

PAST TRENDS AND THE PRESENT SITUATION

Population Growth

2. Expansions of the proposed magnitudes would create a major discontinuity in population trends in Tayside. Whereas in the nineteenth century population grew rapidly, the twentieth century has so far been characterised by a more or less stationary population (Diagram 15). This has been the net result of natural increase being offset by continuing net emigration (Diagram 16).

3. Between 1931 and 1966, the growth of the Tayside population was slow and uneven. During the 1930s the size of the population remained virtually unchanged, and in the 1940s it grew by +15,000. In the 1950s growth was less than +1,000 and, so far, the 1960s have seen early growth offset by later decline. In general, Tayside population growth rates have been below those of Scotland as a whole and they fall farther below the rates for England and Wales (Table 11.2).

Migration

4. The expansion proposals would require major changes in migration trends. Net emigration has been the norm for Tayside as a whole since the end of the nineteenth century, though levels have fluctuated considerably (Diagram 16). The growth proposals would require net immigration over a prolonged period.

5. In Table 11.3 estimates are given of average annual gross and net flows of migrants between Tayside, the rest of Scotland, England and Wales, and overseas, for 1961–1966. The estimates are not precise but they support the following conclusions:—

(a) An average net outflow of nearly –3,000 persons per year, divided more or less equally between overseas destinations and England, was experienced between 1961 and 1966.

(b) In contrast, during the same period, Tayside was in approximate numerical migration balance with the rest of Scotland.

(c) In every case, gross flows far exceeded net flows.

Estimates by the Registrar General indicate that between 1966 and 1968, net emigration from Tayside continued at about –3,000 persons a year.

6. The gross and net flows of migrants shown in Table 11.3 are average annual figures for 1961–1966, but flows were not constant throughout that period. Estimates for individual years cannot be given for Tayside but estimates of the net flows for Scotland indicate the general movements (Table 11.4). The most striking feature is that net emigration overseas increased steadily throughout the period 1961–1966. But net emigration to the rest of the UK fluctuated only to a limited extent with a marked decrease in the later years. Net emigration overseas has become the more important category of loss affecting population growth in Scotland and in Tayside. All evidence available suggests that trends in overseas migration from Tayside are not significantly different from Scottish trends.

7. The demographic (and economic) effects of migration depend not only on the numbers of migrants but also on their age and sex structure (Appendix, Table 11.10). Between 1961 and 1966 most of Tayside's net loss was concentrated in the younger, most active and most fertile age groups; 56% of the net emigrants were aged between 15 and 35 compared with only 26% of the total population. Net immigration into Tayside occurs in the older age groups (65 years and over) and is more marked among women than men.

Age and Sex Structure and Natural Increase

8. The age structure of the Tayside population is similar to that of Scotland (Diagram 17). In the younger age groups the quinquennial variations are largely the product of past variations in fertility, whereas the shape of the pyramid is modified to an increasing extent as age increases by the cumulative effects of net emigration. The effects of the low fertility of the inter-war years and the post-war increase in births are obvious.

9. In recent years Tayside's natural increase (as the excess, on a proportional basis, of births over deaths) has been consistently lower than that of Scotland (Diagram 18); and since 1961 it has been lower than natural increase in England and Wales. The White Paper *Scotland: A Plan for Expansion 1966/1970* stressed that a 'very significant feature of the Scottish population pattern is the relatively high rate of natural increase in

comparison with the corresponding increase for England and Wales'. This does not now hold true in Tayside (and it has recently become less marked for Scotland).

10. In 1966 the crude birth rate for Tayside was lower than the rate for Scotland (Diagram 18) and this accounted for two thirds of the difference between the respective rates of natural increase. Part of the difference in crude birth rates (one eighth) can be explained by variation between the age and sex structures of Tayside and Scotland, but most of the difference is due to lower age specific fertility rates in Tayside. In contrast, Tayside's higher crude death rates (Diagram 18) can be explained in full by variations between the age and sex structures of Tayside and Scotland. Age specific mortality rates are slightly lower in Tayside than in Scotland.

11. Although natural increase has been lower than in Scotland and in England and Wales, the structure and demographic characteristics of the Tayside population are satisfactory from the point of view of population replacement and limited growth.

Population Location

12. The distribution of population in Tayside, in Diagram 14, shows

1. the concentration of a high proportion of the population in a corridor including Perth, Dundee and Arbroath, and
2. the contrasting settlement patterns of the highland and lowland areas of Tayside.

13. In 1966, 66% of the population lived in the Perth/Dundee/Arbroath corridor (an area comprising Dundee City, Arbroath and Perth Large Burghs, Carnoustie, Monifieth, Newport, Tayport and Abernethy Small Burghs, and Carnoustie, Monifieth and Perth Districts of County). The corridor includes only 13% of the Tayside land area and in 1966, 297,500 persons lived in it at an average density of only 1.1 persons per acre. A long-term trend towards increasing concentration of the Tayside population in the corridor, centred on Dundee, is continuing but it has been less marked in recent years.

14. In lowland Tayside the population is spread widely, apart from the concentration described above. But north of the line Crieff-Kirriemuir there are relatively few communities, and these thread the highland glens between uplands empty of people.

15. The broad distribution of population between Dundee and the county divisions is given in Table 11.1. In 1966, 41% of the Tayside population lived in Dundee City, 25% lived in Tayside Perthshire, 21% in Angus, and 13% in Tayside Fife.

16. The population centroid for Tayside in 1966 has been estimated to lie within the western boundary of Dundee, in the Camperdown Park area.

Local Trends

17. The demographic characteristics of the 30 burghs and 12 districts of county in the Study Area are not homogeneous. Population changes, natural increase, and net migration between 1951 and 1966 are given in Table 11.5 for all local authority areas in Tayside.

18. A general description of burgh population trends between 1931 and 1966 would be that growth, continuous but slow, has been mainly restricted to the Perth/Dundee/Arbroath corridor and decrease, again continuous, to the peripheral areas, the East Neuk, and North-East Strathmore. In the intermediate areas (Strathearn, Strathmore, Howe of Fife) population levels have fluctuated.

19. Table 11.5 shows that between 1951 and 1966 the three largest towns in Tayside all increased in population. Over the same period population rose in some small burghs and fell in others, but the total population of the small burghs in 1966 was the same as in 1951. The districts of county with the exception of Perth District, all had smaller populations in 1966 than in 1951. Thus there has been growth in the largest towns, growth and decline among the small burghs, and decline in the rural districts.

20. Table 11.5 shows also that only about 4% of the natural increase that occurred in the region between 1951 and 1966 was attributable to small burghs, and that this was entirely offset by natural decrease in other small burghs. Nearly three quarters of Tayside's 1951–1966 natural increase occurred in Dundee, Perth and Arbroath, and about one quarter in the districts of county. To the extent that population expansion may be achieved by retention of natural increase, the concentration of most of the natural increase in Dundee and the two large burghs is one pointer to possible locations for development particularly in the years immediately ahead.

21. Net loss by migration from Dundee, Perth, and Arbroath was considerable over the years 1951–66, (–14,700) but this loss was more than offset by natural increase (+23,500) and the populations of the three towns increased. On the other hand, net emigration from the districts of county (–18,000) was about two and a half times their natural increase (+7,300) and their combined populations declined sharply.

22. High rates of emigration from the rural areas and consequential declines in the rural population have long been features of the Tayside scene. Emigrants from county districts have tended to move shorter distances, on average, than emigrants from the burghs. Between 1961 and 1966 approximately 40% of emigrants moving from Dundee to destinations within Britain moved to England and Wales. This compares with approximately 25% of emigrants from Tayside small burghs and 15% of emigrants moving from Tayside districts of county. Generally the rural areas have provided the Tayside burghs, over a long period, with immigrants to replace burgh losses to other places, but there are indications now that the population of the rural areas is not only decreasing but is also ageing. If this continues the rural population will play a diminishing role in supplying immigrants to the burghs, to the detriment of the latter's migration balances.

23. The demographic characteristics of Dundee, Perth, and Arbroath are similar to those of Tayside as a whole, but there is more variation in the smaller towns. Many of the small burghs have unusual age structures, with low proportions of persons aged 20 to 35, and this is accompanied in some cases by natural decrease and net emigration. It should be noted, however, that although some small burghs have had unusual age structures for long periods, only the East Neuk burghs had significantly smaller populations in 1966 than in 1931. The low proportion of people aged 20 to 35 reflects the limited job opportunities in or within commuting distance of the small burghs. The future size and stability of a small burgh's population can be greatly affected (proportionately) by quite small changes (absolutely) in local job opportunities, commuting distances, and housing supply and demand. Thus favourable or unfavourable local demographic characteristics can be quickly eclipsed by quite small economic changes and the temptation to read too much of the future from demographic facts alone should be avoided.

24. Nevertheless certain burghs, indicated below, show signs of continuing population decrease. Other burghs have exhibited similar demographic symptoms but in these cases other evidence suggests that decrease will not continue and they are, therefore, not mentioned in this paragraph.

Montrose and Brechin
These burghs, situated close together in north-east Strathmore, are Tayside's fourth and seventh largest towns respectively with a combined population of more than 17,000 in 1966. They have both experienced population decrease since about 1880, apart from a brief period of growth after World War II. Between 1951 and 1966 both lost population by net emigration and had low rates of natural increase.

Alyth, Coupar Angus, Blairgowrie and Rattray
These burghs, grouped together in west Strathmore, had a combined population of about 9,000 in 1966. All three lost population by net emigration between 1951 and 1966, and experienced natural decrease until recently.

The Five East Neuk Burghs
The East Neuk burghs (Kilrenny and Anstruther, Pittenweem, St Monance, Crail, Elie and Earlsferry) had a total population of 7,500 in 1966. Taken together, the five burghs have been experiencing long-term natural decrease, although in individual years Crail, Kilrenny and St Monance have recorded more births than deaths. Over the years 1951–66 the burghs lost increasing numbers by net amigration.

Newburgh
Newburgh had a population of 2,200 in 1966. Natural increase fell over the period 1951–1966 and increasing numbers were lost by net emigration.

PROJECTIONS OF FUTURE POPULATION

25. Forecasts of how population might increase and how its structure might change are fundamental to the preparation of regional plans. Certain demographic implications that arise directly from population projections have to be considered, and the projections provide bases for estimates of housing needs, educational needs, labour supply, and so on.

26. In estimating future population many variables have to be allowed for and uncertainty, in differing degrees, is attached to them all. Future fertility and migration trends in particular are highly uncertain. In one event we prepared eight population projections. Two fertility assumptions, corresponding to upper and lower limits of likelihood, were combined with four migration assumptions.

27. The upper limit fertility assumption was that the comparatively high level of fertility experienced in Tayside between 1961 and 1966 would continue, modified by small fluctuations in accordance with the Registrar General's 1966 expectations of fertility trends in Scotland. The lower limit assumption was that fertility in Tayside would fall from the 1966 level to a level equal to the lowest fertility experienced since 1945 (during the early 1950s); this was assumed to happen by 1976 with fertility continuing thereafter at that level.

28. The four migration assumptions were as follows:

1. Net emigration would fall to zero by 1976 and then a constant annual level of net immigration would occur such that, taking account of both net immigration and natural increase, the upper limit population growth proposed in the Study remit (+300,000) would be attained by 2001.
2. Net emigration would fall to zero by 1976 and then a constant annual level of net immigration would occur such that, taking account of both net immigrations and natural increase, the lower limit population growth proposed in the Study remit (+175,000) would be attained by 2001.
3. Net emigration would fall to zero by 1976 and remain zero thereafter.
4. The average annual level of net emigration experienced in Tayside between 1961 and 1966 would continue unchanged.

The assumption that net immigration would continue, as in 1 and 2, at constant annual rates is discussed in paragraph 36.

29. Details of the population projections and the assumptions underlying them are given in the Appendix to this chapter.

DEMOGRAPHIC IMPLICATIONS OF THE PROJECTIONS

Total Population and Migration

30. The changes in total population arising from the eight projections are shown in Table 11.6(a).

31. Continuing net emigration at the 1961–1966 level, with high fertility, would reduce population by −7,000 by 2001 (EMHF 1). The same level of net emigration, combined with low fertility would reduce population by −55,000 by the end of the century (EMLF 1). Assuming that net migration was reduced to zero by 1976, and remained zero thereafter, population would grow by +118,000 by 2001 if fertility was high (OMHF 1) and by +61,000 if fertility was low (OMLF 1). Past migration

and current trends, in Tayside and Scotland, suggest that it is unlikely that net emigration could be reduced to zero before 1976, and that the range of migration assumptions covered by the four projections EMHF 1, EMLF 1, OMHF 1, OMLF 1, appears realistically to bracket the future range of migration probabilities. The lower limit of these assumptions is that the 1961–66 net emigration level would continue indefinitely (–2,640 persons a year); the upper limit is that net emigration would end by 1976 to be followed by zero net migration, (Diagram 19) Thus population change of between +118,000 and –55,000 can be seen as the probable range of population growth or decline between 1966 and 2001, given continuation of present trends. The corresponding figures for the period 1966 to 1981 are +26,000 and –19,000.

32. The remit for the Study requires us to consider expansion of the present population of the region by +175,000 to +300,000 by 2001. These goals lie much above the upper limit of the range described in paragraph 31. As has already been indicated, the remit proposals would bring major discontinuity to Tayside's population trends, and Diagram 19 shows the extent to which this is so. The whole range of remit growth lies above the highest level of the range of current probabilities, which itself departs significantly from past trends.

33. Substantial in-migration to Tayside will be essential if either of the remit proposals is to be achieved. The migration assumptions are, therefore, of considerable importance. It is reasonable, given existing policies and trends, to assume that the worst that would happen is that the average annual net migration rate for 1961–66 (–2,640 persons) would continue. But net migration at this level would produce, with the low and high fertility assumptions, a 2001 population of only 397,000 to 445,000, –55,000 to –7,000 lower than in 1966. While the best that would happen is likely to be annual net migration of less than –2,600, we think that a reduction of net migration to zero by 1976 is more than can be reasonably foreseen on the basis of existing evidence, policies and trends. Beyond this, we think that it would require special circumstances and/or additional policy effort to achieve zero net migration by 1976 and to maintain it at zero thereafter.

34. Zero net migration continuing from 1976 means that Tayside would retain, year after year, the equivalents in terms of quantity of its natural increases of population. Neglecting differences in the age and sex distributions of the equal gross outflows and inflows of migrants, the growth of population within the region would then depend on the fertility assumptions. And population growth would be, with the low and high fertility assumptions, in the range +61,000 to +118,000 by 2001 (OMLF 1, OMHF 1). Even the higher of these figures lies below the minimum remit increase of +175,000 and it is clear that achievement of the remit population proposals would require substantial net inward migration.

35. Many patterns of net inward migration from 1976 would be consistent with population increases of +175,000 or +300,000 by 2001. It is impossible, from the available evidence, reasonably to base a pattern or patterns on the requirements of population and industry in Scotland and the UK in the last quarter of the century. We cannot say that, because of congestion elsewhere, changes in preferences, etc., so many firms and so many people will want, or have to come to Tayside in specified years. In the circumstances, our migration assumptions from 1976 have been based, of necessity, on the remit requirements and not on forecasts, however speculative, of what would be most likely to happen. The assumptions are very largely no more than arithmetical expressions of the net rates of immigration that would be required from 1976 if, given reasonable demographic assumptions, the remit proposals for population were to be achieved by 2001.

36. We assumed that the required net immigration should be spread over as many years as possible with equal numbers of net immigrants in each year. The reasons for this assumption included the following. First, this assumption is simple to apply and interpret in a situation in which the size with respect to time of any flow of net immigrants cannot be foreseen. Secondly, no other pattern seemed to be more realistic or to offer greater planning advantages, *eg* with respect to the demand falling on the construction industries. Thirdly, given that any annual rates of net immigration that had to be postulated would be high relative to current experience, it seemed advisable to select patterns that kept them as low as possible by spreading the requirements over as many years as possible.

37. Given the assumptions, the projections indicate that if the upper remit proposal of +300,000 population growth is to be achieved, then the average rate of net immigration between 1976 and 2001 must be of the order of +5,000–6,900 persons a year (IMHF 1, IMLF 1). Similarly the projections indicate that if the lower remit proposal of +175,000 is to be achieved, then the average rate of net immigration between 1976 and 2001 must be of the order of +1,600–3,300 persons a year (IMHF 2, IMLF 2). Such rates of net immigration, sustained over 25 years, stand in clear contrast to past trends and, given present trends and policies, are considerably in excess of what might, with reasonable optimism, be expected.

38. As the immediately preceding paragraphs explain, the migration assumptions, on which the population projections are based, are little more than guidelines derived from the remit targets for examining the implications and requirements of the remit expansion proposals. It is obvious that reality could diverge substantially from these migration assumptions. And we must emphasise that the achievement, not only of the indicated figures of net immigration but of any other pattern of net immigration that would enable the Tayside population to expand by +175,000 to +300,000 by 2001, lies beyond what might reasonably be expected on the basis of present trends and policies.

Population of Working Age

39. Changes in the population of working age corresponding to each population projection are summarised in Table 11.6(b) (Age Group II). With net emigration

continuing at the level of 1961–66, the population of working age would fall by –16,000 to –34,000 by the end of the century (EMHF 1, EMLF 1).

40. If net emigration fell to zero by 1976 then, although the population of working age would fall in the period 1966 to 1971, it would start to increase in the 1970s and rise above the 1966 level before 1981. With net migration continuing at zero from 1976, the population of working age would grow by +46,000 to +65,000 between 1966 and 2001 (OMLF 1, OMHF 1). The high rates of net immigration after 1976 implied by the range of growth proposed in the remit would result in an increase of +100,000 to +197,000 in the population of working age betwen 1966 and the end of the century (IMHF 2, IMLF 1).

Children

41. Table 11.6(b) also summarises (Age Group I) the changes in the child population corresponding to each population projection. Changes in fertility levels, as well as migration, markedly affect the size of the population under 15 years of age. If net emigration continued at the 1961–1966 level, the child population would rise by as much as +11,000 by 2001 or fall by –20,000 depending on fertility (EMHF 1, EMLF 1). If net migration fell to zero by 1976 and remained zero thereafter, the child population would rise by between +14,000 and +51,000 by the end of the century (OMLF 1, OMHF 1). The remit range of growth would result in an increase in the child population of +50,000 to +115,000 by 2001 (IMLF 2, IMHF 1).

Population over Retirement Age

42. Over the period 1966 to 1981 there is little or no variation in the numbers of persons over retirement age in the various population projections (Age Group III of Table 11.6(b)) and this number grows from 76,000 in 1966 to 86,000–87,000 in 1981. A continuation of the 1961–66 level of net migration would reduce the total to 75,000 in 2001 (EMHF 1, EMLF 1) whereas the maximum remit range of growth would increase the total to 89,000 (IMLF 1).

Population Structure

43. The projections (Table 11.6(c)) indicate increasing proportions of children (under 15 years) over the period 1966–2001, except where the low fertility assumption is combined with continuation of existing net migration (EMLF 1) or zero net migration from 1976 (OMLF 1). At the other end, the proportions of persons over retirement age (65 for men, 60 for women) would increase in the period 1966–81, and then fall from 1981 to 2001. In every projection, except the two based on the continuation of the 1961–66 level of net migration (EMHF 1, EMLF 1) the proportion would be lower in 2001 than in 1966.

44. The estimates also show, perhaps unexpectedly, that if net emigration were to continue at the 1961–66 level the overall population structure of Tayside, by 2001, would not have moved very far from its present structure. However the sustained high levels of net immigration that would be required to reach the remit populations by 2001 would bring substantial changes. By 2001 Tayside population would be much younger on average than in 1966 with only 12–13% of the relevant populations over retirement age (IMHF 1,2, IMLF 1,2). These populations would be experiencing very high rates of natural increase given that the assumed fertility rates did not fall.

PROJECTIONS OF THE FUTURE NUMBERS OF HOUSEHOLDS

45. Projections of the future numbers of households in Tayside have been prepared from the population projections (Table 11.7(a)). These household projections form the basis of various other forecasts *eg* the estimates of housing need given in Chapter 17.

46. The number of households, and therefore housing need, depends not only upon the size of the population but also upon its age and sex structure, the numbers of persons married, and the proportions of persons in all age, sex and marital status groups who effectively head separate households. Increasing real income tends to increase the proportions of persons able to establish or maintain separate households. Allowance has been made for this factor in the household projections. Uncertainty in the marriage and headships assumptions which underly the household projections has been allowed for by using a range of assumptions in both cases. Details of the household projections and the underlying assumptions are given in the Appendix, and the estimates are summarised in Table 11.7(a)

47. Whereas the population changes in Tayside between 1966 and 1981 given by the projections range from decline of –19,000 to growth of +56,000, the forecast range of change in the number of households is from growth of +4,000 (EMHF 1) to growth of +31,000 (IMLF 1). Thus it is expected that the number of households will grow between 1966 and 1981 even if population declines. Similarly if population grows the number of households is expected to increase at a higher rate. This relative growth in the numbers of households would be caused by changes in age structure, increases in the proportions of married people, and increases in the proportions of persons in all age, sex and marital status groups who effectively head separate households.

48. The average sizes of households corresponding to each projection are given in Table 11.7(b)

SUMMARY OF CONCLUSIONS

49. Since 1900 the population of Tayside has remained around 450,000 as a result of natural increase being offset by net emigration. During the period from 1961 to 1968 approximately 14,000 people moved into the region and 17,000 left on the average each year.

50. About 40% of the regional population lives in Dundee City and about 66% in the Perth-Dundee-Arbroath corridor. There is a long-term trend towards an increasing concentration in this part of the region and to the extent that population growth arises from the retention of natural increase, the greatest potential in this respect is in this area.

51. The growth proposals set by the Study remit

would require a change from the long-established net outward movement to a high level of net immigration over a prolonged period. If net emigration were reduced to zero by 1976, the average rate of net immigration to 2001 would have to be about 6,000 persons a year to achieve the upper growth level of +300,000. However, with zero net emigration from 1976 natural increase alone could add up to 120,000 persons to the population by 2001.

52. On the basis of the alternative assumptions about migration and fertility the range of population change could be from −55,000 to +300,000 by 2001. The planning proposals have to allow for virtually anything within this range.

53. In relation to a long-term growth of 175,000 to 300,000 population as set by the remit, the appropriate growth range for the 1971–1981 period would be 33,000 to 56,000.

54. On assumptions about trends in the formation of new households it is expected that the number of households will increase even if there were no growth in the population. This has to be allowed for in estimating the basic development programme that would be required in a 'no-growth' situation.

Appendix to Chapter 11

PROJECTIONS OF FUTURE TAYSIDE POPULATION: METHODS AND ASSUMPTIONS

A1. The population projections for the Tayside Study accepted two broad principles.

1. Only published and readily available unpublished data were used.
2. The number of variables built into the projections was limited to the extent that any further increase in their number would not result in any useful gain in the accuracy, interpretability, or practical usefulness of the resulting projections.

A2. A component method of projection was used. The total projection period (1966–2001) was split into seven five-year periods and at the starting date of the first quinquennium (1966) the population was divided into five-year age-groups by sex. Then, basically, three sets of calculations were made for each age and sex group for each quinquennium in time order: first, a forecast of loss of population by deaths; secondly, a forecast of gain in population by births; and, thirdly, a forecast of loss or gain in population by migration.

A3. The number of persons in a five-year age-group not dying in one projection quinquennium, and therefore surviving five years to enter the next five-year age-group, was calculated by applying the survival ratio.[1]

$$_5P_x = \frac{1000 - 2\tfrac{1}{2}m_x}{1000 + 2\tfrac{1}{2}m_x}$$

(where m_x is the age and sex specific mortality rate for the age group x to $x + 5$) to the number of persons in the age group. For calculating survivors from the age group up to five years a more detailed method was used.

A4. Births in each projection period were calculated by applying age specific fertility rates to the average number of women in each of the fecund age groups during each year of the five-year periods. Total births for each year were split into boys and girls, assuming that 51.1 per cent of all births would be boys.

A5. For the purposes of birth calculations, net migration by women was, in effect, assumed to be evenly spread throughout each projection period; but the age and sex composition and size of net migration flows were projected as at the end of each projection period and net migrants were added (negatively in some cases) in five-year age-groups by sex at the end of each period.

A6. Marriage was not included as an independent component in the population projections. It would add greatly to the complexity of the calculations, probably with little or no gain. (8% of all births in Tayside were illegitimate in 1966).

A7. A cohort of immigrants can be expected to exhibit a crude birth rate significantly above that of the destination population (assuming, as in Tayside, that this population is large relative to the cohort of immigrants and also long established). An immigrant cohort usually has a significantly younger age structure and normally has a higher proportion of married persons in the most fertile age groups than the destination population. Both the immigration and fertility components of the methodology used are age specific so that the greatest part of the differential between the fertility of the immigrant and existing populations, arising from differentials in age structure, is directly allowed for. But the part of the differential arising from differences in the proportions married poses a problem in a projection methodology which does not include marriage as an independent component. The different proportions married in an immigrant cohort give rise to abnormal age specific fertility rates, particularly in the age group 20–29, and these can be allowed for even without marital specificity. But the age specific fertility rates of a population derived from a series of immigrant cohorts do not usually remain constant, and in fact they can be expected to be asymptotic to those of the existing population as the children of immigrants grow older and exhibit 'normal' marital status distributions. The initial abnormality in the age specific fertility rates of immigrants was allowed for here by inflating the number of persons aged 0–4 in each cohort of immigrants, the cohort then being assumed to exhibit the same age specific fertility as the existing population.

A8. Each demographic component in the population projections (fertility, mortality, migration, etc) was projected from Tayside data for the period 1961–1966.

A9. Age and sex specific mortality rates were estimated for Tayside for the base period and were projected (Table 11.8) in accordance with the Registrar General's 1966 expectations of future trends in age and sex specific mortality rates for Scotland as a whole. A range of mortality assumptions was considered unnecessary because variations from expectations were expected to have insignificant effects on the accuracy of the total projections.

A10. Age specific fertility rates were estimated for the base period for Tayside by applying Scottish rates to the Tayside population and then scaling them all down equally to give the correct number of total births. Future trends in fertility cannot be forecast with sufficient reliability to justify using a single projection, and a range was used. The assumed rates are shown in Table 11.9. The upper limit assumption was that the relatively high level of fertility experienced in Tayside between 1961 and 1966 would continue, although fluctuating to some extent in accordance with the Registrar General's 1966 expectations of fertility trends in Scotland. The lower limit assumption was that fertility would fall linearly from the 1966 level to a level in 1976 equal to the lowest level of fertility experienced in Scotland since 1945 (during the early 1950s) and would continue at that level thereafter.

A11. Migration is the least predictable component in the Tayside population projections. Although the preparation of a single unconditional forecast of long-term population trends would be futile because of the unpredictability of migration, population projections (which are essentially conditional forecasts) can be usefully prepared to study the planning implications of a range of possible migration assumptions.

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[1] P.H. Karmel, *Applied Statistics for Economists*, Pitman, 1963

A12. Ideally immigrants and emigrants would be projected separately but insufficient data are available to justify separate treatment and migration has been projected as a net flow. For this purpose the period 1966–2001 has been divided into two parts, 1966–76 and 1976–2001. It was assumed that the net emigration experienced in Tayside up to 1966 would not end until 1976 at the earliest and that net immigration would not begin until 1976 at the earliest.

A13. For 1966–1976, two migration assumptions were studied: an 'upper limit' assumption that net emigration would fall linearly from the 1961–1966 average level in 1966 to zero by 1976 and a 'lower limit' assumption that the 1961–1966 level would continue. For 1976–2001, four assumptions were made:

1. assuming net emigration already reduced to zero by 1976, a constant level of net immigration was assumed such that the upper limit of the population growth proposed in the remit would be attained by 2001;
2. assuming net emigration already reduced to zero by 1976, a constant level of net immigration was assumed such that the lower limit of the population growth proposed in the remit would be attained by 2001;
3. again assuming zero net migration by 1976, an assumption that zero net migration would continue; and
4. an assumption that the 1961–1966 net emigration level would continue from 1966 to 2001.

A14. Where net immigration is assumed, it has also been assumed to be constant and spread over as long a period as possible. The reasons for this assumption are discussed in paragraphs 35–38 of the main chapter.

A15. The distribution by age and sex in 1966 of net emigrants of 5 years of age or over from Tayside over the period 1961–1966 was estimated from data derived from the 1966 Sample Census. The relative size and structure of the age group under 5 years was estimated separately on the basis of data received from the Registrar General for Scotland which relate to net emigrants from Scotland as a whole. This distribution (Table 11.10) was assumed to continue unchanged whenever net emigration was assumed to occur. When nil net migration is assumed, it is assumed that no net migration occurs in any age group. The distribution by age and sex assumed for net immigrants related to the structure of the immigrant cohort at the end of each five-year period and the distribution used (Table 11.11) was based on immigration data for several new towns.

A16. The four migration assumptions described in paragraphs A13 and A14 were used in conjunction with the two fertility assumptions described in paragraph A10 to give eight population projections, each of which was given a Reference Number. The projections, their Reference Numbers, and their underlying assumptions are given in Table 11.6(a).

A17. The process described so far produced projections which are age and sex specific, but not marital status specific. To prepare projections of future numbers of households, the population projections were made marital status specific by applying projections of proportions married in each age and sex group to the population projections. The projections of proportions married (Table 11.12) have as base the 1966 distribution of proportions married in Tayside. Uncertainty was allowed for by projecting a range of proportions married for each five-year age and sex group. The upper limit projections were then derived for Scotland by inspection of graphs plotted from Census data for Scotland from 1851 to 1966, taking into account time-series relationships for cohorts as well as for age groups. These upper limit projections for Scotland were then adjusted to account for the differences between proportions married in Tayside and in Scotland in 1966. The lower limit projections of proportions married by age and sex group are taken to be equal in all years to the proportions married in 1966.

A18. Projections of future numbers of households were derived by applying age, sex and marital status specific headship rates to the population projections. A headship rate is the percentage of persons in a group defined by age, sex and marital status, who head households. The rates for Tayside for 1961 were derived from rates for Scotland calculated from 1961 Census data[1], adjusted in the light of the limited data available for Tayside from the same Census[2]. Some studies[3] have assumed that such rates will remain stable over time but here it was assumed that headship rates would increase with increasing real incomes in all age, sex and marital status categories (Table 11.13). The assumed upper limit increases are based on Professor D.V. Donnison's suggestions[4] and the lower limit assumptions were set arbitrarily at one half of the upper limit increases. The estimated range of projections of future numbers of households is given, in summary form, for each population projection in Table 11.7(a).

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[1] General Register Office, *Census 1961 (Scotland)*, Volume 3, Table 8, and Volume 4, Part II, Table 10.

[2] General Register Office, *Census 1961 (Scotland)*, Volume 4, Part II, Table 9.

[3] *The Grangemouth/Falkirk Regional Survey and Plan*, Volume 1, HMSO, 1968, p. 118

[4] D.V. Donnison, *The Government of Housing*, Penguin Books, 1967, pp 242–250.

TABLE 11.1 Tayside Population, 1966 (1)

Dundee County of City	183,700
Angus County	94,600
Tayside Perthshire (Perthshire County excluding Western District, Ooune, Ounblane and Callander)	113,300
Tayside Fife (Cupar and St Andrews Districts and Auchtermuchty, Crail, Cuper, Elie and Eerlsferry, Falkland, Ladybank, Newburgh, Newport-on-Tay, Pittenweem, St Andrews, St Monance, Tayport)	60,000
Total Tayside Study Area	451,700

(1) Unless otherwise stated all population data given in this chapter are estimates of the home population, comprising the population of all types actually in the area concerned.

TABLE 11.2 Population Change, 1931–1966 (1)

	Population		*Population change (% per annum)*			
	1931	*1966*	*1931–39*	*1939–51*	*1951–61*	*1961–66*
Tayside	437,000	452,000	+ 0.1	+ 0.2	+ 0 02	– 0.02
Scotland	4,843,000	5,190,800	+ 0.4	+ 0.2	+ 0.2	+ 0.03
England/Wales	39,988,000	47,136,000	+ 0.4	+ 0.5	+ 0.5	+ 0.4

(1) It is estimated that in 1986/67 (mid-year to mid-year) Tayside population fell by about –2,500 but in 1967/68 it remained constant or perhaps rose slightly.

TABLE 11.3 Average Annual Migration, 1961–1966

	Into Tayside	*Out of Tayside*	*Net*
Tayside – Rest of Scotland	+7,800	–7,500	+300
Tayside – England/Wales	+4,000	–5,500	–1,500
Tayside – Overseas	+2,500	–3,900	–1,400
Total	+14,300	–16,900	–2,600

TABLE 11.4 Estimated Net Migration from Scotland, 1961–1967

Thousands

	1951/62	*1962/63*	*1963/64*
Overseas	– 9.0	–13.0	–16.6
Rest of UK	–20.5	–21.0	–24.0
Total	–29.5	–34.0	–40.8
	1964/65	*1965/66*	*1966/67*
Overseas	–21.0	–25.0	–29.0
Rest of UK	–22.0	–22.0	–16.0
Total	–43.0	–47.0	–45.0

TABLE 11.5 Tayside Local Authority Areas: Estimated population changes, Natural Increase, and Net Migration, 1951–1966

	Population		*Population change*	*Change due to*	
	1951	*1966*[1]		*Natural Increase*	*Net Migration*
DUNDEE & TAYSIDE LARGE BURGHS	237,300	248,100	+ 8,800	+23,500	−14,700
TAYSIDE SMALL BURGHS	98,400	98,500	+ 100	0	0
TAYSIDE DISTRICTS OF COUNTIES	115,700	105,500	−10,200	+ 7,300	−18,000[2]
COUNTY OF CITY Dundee	177,300	183,700	+ 8,400	+18,900	−12,500
LARGE BURGHS					
Perth	40,500	41,300	+ 800	+ 3,000	− 2,200
Arbroath	19,500	21,100	+ 1,600	+ 1,600	0
SMALL BURGHS					
Montrose	10,800	10,500	− 300	+ 100	− 400
St Andrews	9,500	10,400	+ 900	+ 100	+ 800
Forfar	10,000	9,900	− 100	+ 150	− 250
Brechin	7,300	8,900	− 400	+ 200	− 600
Cupar	5,500	6,100	+ 600	+ 300	+ 300
Crieff	5,500	5,600	+ 100	− 150	+ 250
Carnoustie	5,200	5,400	+ 200	− 100	+ 300
Blairgowrie and Rattray	5,400	5,100	− 300	0	− 300
Monifieth	3,400	4,200	+ 800	− 50	+ 350
Kirriemuir	3,600	3,800	+ 200	− 150	+ 350
Newport-on-Tay	3,400	3,400	0	− 200	+ 200
Tayport	3,200	3,000	− 200	+ 200	− 400
Kilrenny and Anstruther	3,000	2,800	− 200	0	− 200
Pitlochry	2,400	2,400	0	+ 50	− 50
Auchterarder	2,400	2,400	0	0	0
Newburgh	2,400	2,200	− 200	+ 150	− 350
Coupar Angus	2,200	2,000	− 200	− 50	− 150
Alyth	2,100	1,800	− 300	− 100	− 200
Aberfeldy	1,500	1,500	0	− 50	+ 50
Pittenweem	1,600	1,500	− 100	− 50	− 50
Auchtermuchty	1,300	1,400	+ 100	0	+ 100
St Monance	1,500	1,300	− 200	− 100	− 100
Ladybank	1,100	1,200	+ 100	0	+ 100
Crail	1,200	1,000	− 200	0	− 200
Falkland	1,000	1,000	0	0	0
Elie and Earlsferry	1,200	900	− 300	− 200	− 100
Abernethy	700	800	+ 100	− 50	+ 150
DISTRICTS OF COUNTY[3]					
Perth	21,900	22,000	+ 100	+ 400	− 400
Cupar	14,500	12,500	− 2,000	+ 150	− 700
St Andrews	12,400	11,900	− 500	+ 450	− 700
Central (Perthshire)	9,800	9,300	− 500	+ 50	+ 400
Eastern (Perthshire)	9,300	8,500	− 800	+ 200	− 800
Highland (Perthshire)	10,000	8,300	− 1,700	0	+ 100
Monifieth	7,800	7,400	− 400	+ 100	− 400
Forfar	7,600	6,800	− 800	+ 250	− 400
Carnoustie	5,700	5,200	− 500	+ 300	− 1,000
Montrose	6,000	5,200	− 800	+ 150	− 450
Brechin	5,700	4,400	− 1,300	+ 200	− 700
Kirriemuir	5,000	4,000	− 1,000	+ 100	− 350

Notes

[1] The populations given for Tayside local authority areas in 1966 total approximately 1,500 less than the estimated population of Tayside in 1966. The difference, which is exaggerated by rounding, arises because the estimate of population for Tayside is to some extent independent of the local authority estimates.

[2] This figure is difficult to estimate. It should be taken as indicative of the range −18,000 ± 2,000

[3] Changes due to natural increase and net migration listed for Districts of County refer to the period 1961–1966, whereas the changes in population listed refer to 1951–1966

TABLE 11.6(a) Tayside Population Projections: Range of Population Change, 1966–2001

Fertility Assumption	*Migration Assumption 1966–1976*	*Migration Assumption 1976–2001*	*Reference Number*[1]	*Total Population*						*Total Population change 1966–2001*
				1966	*1971*	*1976*	*1981*	*1991*	*2001*	
				(thousands)						
High Fertility	1961–1966 net emigration level continuing	1961–1966 net emigration level continuing	EMHF 1	452	450	448	446	442	445	– 7
	Net emigration falling to zero by 1976	Zero net migration 1976–2001	OMHF 1	452	454	464	478	516	570	+118
		1,600 net immigrants per year, 1976–2001	IMHF 2[2]	452	454	464	488	547	827	+175[2]
		5,000 net immigrants per year, 1976–2001	IMHF 1[2]	452	454	464	508	615	752	+300[2]
Low Fertility	1961–1966 net emigration level continuing	1961–1966 net emigration level continuing	EMLF 1	452	448	442	433	416	397	– 55
	Net emigration falling to zero by 1976	Zero net migration 1976–2001	OMLF 1	452	452	457	466	487	513	+ 61
		3,300 net migrants per year, 1976–2001	IMLF 2[2]	452	452	457	485	550	627	+175[2]
		6,900 net migrants per year, 1976–2001	IMLF 1[2]	452	452	457	506	619	752	+300[2]

Notes 1. Indicates assumptions regarding fertility and migration.
2. Remit proposals for population growth.

TABLE 11.6(b) Tayside Population Projections: Age Structure, 1966–2001 (in thousands)

Reference Number[1]	EMHF 1			OMHF 1			IMHF 2			IMHF 1			EMLF 1			OMLF 1			IMLF 2			IMLF 1		
Age Group[2]	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1966	108	268	76	108	268	76	108	268	76	108	268	76	108	268	76	108	268	76	108	268	76	108	268	76
1971	109	259	82	110	262	82	110	262	82	110	262	82	108	259	82	109	262	82	109	262	82	109	262	82
1976	110	252	86	116	263	86	116	263	86	116	263	86	104	252	86	109	263	88	109	263	86	109	283	86
1981	110	250	86	121	272	86	125	277	86	133	289	87	97	250	86	108	272	86	115	283	86	124	295	87
1991	111	248	83	136	296	84	148	314	86	176	352	87	92	241	83	114	290	84	138	326	86	165	366	88
2001	118	252	76	158	333	78	178	368	81	222	444	86	87	234	76	121	314	79	167	386	84	182	465	89

Notes 1. Indicates assumptions regarding fertility and migration (cf. Table 11.6(a)

2. I Child population: males and females under 16 years.

II Population of working age. males aged 15 and over, but under 66 years: females aged 15 and over but under 60 years.

III Population over retirement age: males aged 65 and over, females aged 60 and over.

TABLE 11.6(c) Tayside Population Projections: Age Structure, 1966–2001 (percentages of total population)

Reference Number[1]	EMHF 1			OMHF 1			IMHF 2			IMHF 1			EMLF 1			OMLF 1			IMLF 2			IMLF 1		
Age Group[2]	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1966	24	59	17	24	59	17	24	59	17	24	59	17	24	59	17	24	59	17	24	59	17	24	59	17
1971	24	58	18	24	58	18	24	68	18	24	58	18	24	58	18	24	58	18	24	58	18	24	58	18
1976	25	56	19	25	67	18	25	67	18	25	57	18	24	57	19	24	57	19	24	57	19	24	67	19
1981	25	56	19	25	57	18	26	57	17	26	57	17	22	58	20	23	58	19	24	58	18	24	58	18
1991	25	56	19	26	58	16	27	57	16	29	57	14	22	58	20	23	60	17	25	59	16	27	59	14
2001	26	67	17	28	58	14	28	59	13	29	59	12	22	59	19	24	61	15	26	62	13	26	62	12

Notes 1. Indicates assumptions regarding fertility and migration (cf. Table 11.6(a).)

2. I Child population: males and females under 16 years.

II Population of working age. males aged 16 and over, but under 65 years: females aged 16 and over but under 60 years.

III Population over retirement age: males aged 65 and over: females aged 60 and over.

TABLE 11.7(a) Tayside Population Projections: Numbers of Households, 1966—2001 (thousands)

Reference Number[1,2]	*1966*	*1971*	*1976*	*1981*	*1991*	*2001*
EMHF 1	150	152 ± 2	155 ± 3	157 ± 3	159 ± 6	160 ± 5
OMHF 1	150	153 ± 2	159 ± 3	166 ± 4	181 ± 6	200 ± 7
IMHF 2	160	153 ± 2	159 ± 3	168 ± 4	189 ± 8	217 ± 8
IMHF 1	150	153 ± 2	159 ± 3	175 ± 5	208 ± 6	264 ± 9
EMLF 1	150	152 ± 2	155 ± 3	157 ± 3	157 ± 4	154 ± 6
OMLF 1	150	153 ± 2	159 ± 3	166 ± 4	179 ± 6	193 ± 7
IMLF 2	150	153 ± 2	159 ± 3	171 ± 4	197 ± 8	228 ± 8
IMLF 1	160	153 ± 2	159 ± 3	177 ± 4	216 ± 6	267 ± 9

Notes 1. Indicates assumptions regarding fertility and amigration (cf. Table 11.8(e)

2. A further projection was made in which population was assumed to remain constant from 1966. This projaction, which allowed for changes in population structure, gave the numbars of households shown below

(In thousands)

1966	*1971*	*1981*	*1991*	*2001*
150	153	160	165	167

The projection of average household sizes was assumed to be an average of those for population projections EMHF 1 and OMLF 1.

TABLE 11.7(b) Tayside Population Projections: Average household size, 1966—2001[1]

(parsons per household)

Reference Numbar[2]	*1966*	*1971*	*1976*	*1981*	*1991*	*2001*
EMHF 1	3.02±0.01	2.95±0.03	2.90±0.05	2.86±0.06	2.78±0.08	2.77±0.09
OMHF 1	3.02±0.01	2.96±0.03	2.92±0.05	2.88±0.06	2.86±0.08	2.86±0.10
IMHF 2	3.02±0.01	2.96±0.03	2 92±0.05	2.90±0.06	2.89±0.08	2.89±0.10
IMHF 1	3.02±0.01	2.96±0.03	2 92±0.05	2.90±0.06	2.96±0.08	2.96±0.11
EMLF 1	3.02±0.01	2.95±0.03	2 85±0.05	2.77±0.06	2.66±0.08	2.59±0.09
OMLF 1	3.02±0.01	2.95±0.03	2 87±0.05	2.81±0.06	2.73±0.08	2.67±0.09
IMLF 2	3.02±0.01	2.95±0.03	2 87±0.05	2.83±0.06	2.80±0.08	2.75±0 10
IMLF 1	3.02±0.01	2.95±0.03	2 87±0.05	2.86±0.06	2.87±0.08	2.82±0.10

Notes 1. The average numbers of persons per household are of the simple form

$$\frac{\text{total population}}{\text{total private households.}}$$

In fact, the total population consists of persons in both private and non-private households. It is extremely difficult to estimate the proportion of persons in non-private households not having, or not needing, private housing provision.

2. Indicates assumptions regarding fertility and migration (cf. Table 11.6(a).)

TABLE 11.8 Tayside Population Projections: Estimates (1961–66) and Projections (1966–2001) of Age Group Specific Mortality Probabilities

MALES

AGE (Years)	1961–66	1966–71	1971–76	1976–81	1981–86	1986–91	1991–96	1996–2001
1 – 4	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007
5 – 9	0.0018	0.0016	0.0014	0.0013	0.0012	0.0011	0.0010	0.0009
10 – 14	0.0021	0.0019	0.0017	0.0015	0.0014	0.0013	0.0012	0.0011
15 – 19	0.0038	0.0034	0.0031	0.0028	0.0025	0.0024	0.0022	0.0020
20 – 24	0.0049	0.0044	0.0040	0.0036	0.0032	0.0029	0.0026	0.0023
25 – 29	0.0051	0.0046	0.0042	0.0038	0.0034	0.0031	0.0028	0.0025
30 – 34	0.0073	0.0067	0.0061	0.0056	0.0061	0.0046	0.0042	0.0038
35 – 39	0.0113	0.0104	0.0096	0.0089	0.0082	0.0076	0.0070	0.0065
40 – 44	0.0229	0.0213	0.0199	0.0186	0.0173	0.0161	0.0150	0.0140
45 – 49	0.0363	0.0342	0.0322	0.0303	0.0285	0.0268	0.0252	0.0237
50 – 54	0.0548	0.0519	0.0492	0.0466	0.0441	0.0418	0.0396	0.0375
55 – 59	0.1017	0.0972	0.0929	0.0888	0.0848	0.0810	0.0774	0.0739
60 – 64	0.1532	0.1472	0.1414	0.1359	0.1306	0.1255	0.1206	0.1159
65 – 69	0.2293	0.2220	0.2150	0.2082	0.2016	0.1952	0.1890	0.1830
70 – 74	0.3210	0.3127	0.3046	0.2967	0.2890	0.2815	0.2742	0.2671
75 – 79	0.4540	0.4453	0.4368	0.4285	0.4203	0.4123	0.4044	0.3967
80 – 84	0.8040	0.7941	0.7843	0.7746	0.7650	0.7555	0.7462	0.7370
Po (probability of surviving to first birthday)	0.9781	0.9803	0.9823	0.9842	0.9858	0.9872	0.9885	0.9897

FEMALES

AGE (Years)	1961–66	1966–71	1971–76	1976–81	1981–86	1986–91	1991–96	1996–2001
1 – 4	0.0009	0.0008	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005
5 – 9	0.0012	0.0011	0.0010	0.0009	0.0008	0.0007	0.0006	0.0005
10 – 14	0.0010	0.0009	0.0008	0.0007	0.0006	0.0005	0.0005	0.0004
15 – 19	0.0016	0.0014	0.0013	0.0012	0.0011	0.0010	0.0009	0.0008
20 – 24	0.0026	0.0023	0.0021	0.0019	0.0017	0.0015	0.0014	0.0013
25 – 29	0.0036	0.0032	0.0029	0.0026	0.0023	0.0021	0.0019	0.0017
30 – 34	0.0050	0.0045	0.0040	0.0036	0.0032	0.0029	0.0026	0.0023
35 – 39	0.0081	0.0073	0.0066	0.0060	0.0054	0.0049	0.0044	0.0040
40 – 44	0.0148	0.0135	0.0123	0.0112	0.0102	0.0093	0.0085	0.0077
45 – 49	0.0228	0.0210	0.0194	0.0179	0.0165	0.0152	0.0140	0.0129
50 – 54	0.0326	0.0304	0.0283	0.0264	0.0246	0.0229	0.0213	0.0199
55 – 59	0.0544	0.0512	0.0482	0.0454	0.0428	0.0403	0.0380	0.0358
60 – 64	0.0852	0.0810	0.0770	0.0732	0.0696	0.0662	0.0629	0.0598
65 – 69	0.1411	0.1356	0.1303	0.1252	0.1203	0.1156	0.1111	0.1067
70 – 74	0.2105	0.2038	0.1973	0.1910	0.1849	0.1790	0.1733	0.1678
75 – 79	0.3603	0.3519	0.3437	0.3357	0.3279	0.3203	0.3129	0.3056
80 – 84	0.6685	0.6584	0.6484	0.6386	0.6289	0.6194	0.6100	0.6008
Po (probability of surviving to first birthday)	0.9830	0.9847	0.9863	0.9877	0.9890	0.9901	0.9911	0.9920

TABLE 11.9 Tayside Population Projections: Age Group Specific Fertility Rates per 1,000 Females, Estimates (1961–66) and Projections (1966–2001)

UPPER LIMIT ASSUMPTION (HF)

AGE (Years)	*1961–66*	*1966–71*	*1971–76*	*1976–81*	*1981–86*	*1986–91*	*1991–96*	*1996–2001*
15 – 19	32.8	31.8	32.4	31.6	31.4	33.2	33.9	33.6
20 – 24	174.7	169.6	172.5	168.4	167.4	176.8	180.7	179.1
25 – 29	183.5	178.2	181.2	178.9	175.8	185.6	189.7	188.0
30 – 34	110.3	107.1	108.9	106.3	105.7	111.6	114.1	113.1
35 – 39	54.2	52.6	53.5	52.2	51.9	54.8	56.0	55.5
40 – 44	15.2	14.8	15.0	14.6	14.6	15.4	15.7	15.6
46 – 49	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0

LOWER LIMIT ASSUMPTION (LF)

AGE (Years)	*1961–66*	*1966–71*	*1971–76*	*1976–81*	*1981–86*	*1986–91*	*1991–96*	*1996–2001*
15 – 19	32.8	30.7	28.1	27.0	27.0	27.0	27.0	27.0
20 – 24	174.7	163.5	149.7	143.8	143.8	143.8	143.8	143.8
25 – 29	183.5	171.8	157.3	151.1	151.1	151.1	151.1	151.1
30 – 34	110.3	103.2	94.6	90.8	80.8	80.8	90.8	90.8
35 – 39	54.2	50.7	46.4	44.8	44.8	44.6	44.6	44.6
40 – 44	15.2	14.3	13.1	12.5	12.5	12.5	12.5	12.5
45 – 49	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8

TABLE 11.10 Tayside Population Projections: Estimated Age Sex Structure at End of Quinquennium of a Net Flow of 1,000 Emigrants from Tayside, 1961–66

AGE GROUP *Years*	*MALE*	*FEMALE*
0 – 4	– 48	– 44
5 – 9	– 39	– 42
10 – 14	– 51	– 49
15 – 19	– 61	– 49
20 – 24	– 88	– 89
25 – 29	– 72	– 66
30 – 34	– 59	– 49
35 – 39	– 39	– 34
40 – 44	– 28	– 25
45 – 49	– 24	– 11
50 – 54	– 14	– 9
55 – 59	– 8	– 8
60 – 64	– 2	+ 1
65 – 69	+ 1	+ 2
70 – 74	+ 1	+ 1
75 – 79	+ 1	+ 1
80 – 84	0	0
85+	0	0
	– 530	– 470
TOTAL	– 1000	

TABLE 11.11 Tayside Population Projections: Assumed Age Sex Structure at End of Quinquennium of a Quinquennial Flow of 1,000 Net Immigrants

AGE GROUP *Years*	*MALE*	*FEMALE*
0 – 4	+ 89	+ 84
5 – 9	+ 57	+ 54
10 – 14	+ 34	+ 33
15 – 19	+ 18	+ 25
20 – 24	+ 54	+ 69
25 – 29	+ 70	+ 65
30 – 34	+ 56	+ 43
35 – 39	+ 43	+ 35
40 – 44	+ 30	+ 25
45 – 49	+ 20	+ 16
50 – 54	+ 16	+ 10
55 – 59	+ 11	+ 6
60 – 64	+ 6	+ 8
65 – 69	+ 4	+ 8
70 – 74	+ 2	+ 5
75 – 79	+ 1	+ 5
80 – 84	0	0
85+	0	0
	+ 609	+ 491
TOTAL	+ 1000	

TABLE 11.12 Tayside Population Projections: Proportions of 10,000 Married, Estimates (1966) and Projections (1971–2001)

AGE GROUP YEARS	*1966*	*1971*	*1976*	*1981*	*1986*	*1991*	*1996*	*2001*
				MALES				
15 – 19	200	234 ± 34	270 ± 70	305 ± 105	340 ± 140	370 ± 170	405 ± 206	440 ± 240
20 – 24	3062	3186 ± 124	3276 ± 214	3366 ± 304	3456 ± 394	3546 ± 484	3636 ± 574	3726 ± 664
25 – 29	7375	7574 ± 199	7634 ± 259	7699 ± 324	7759 ± 384	7819 ± 444	7884 ± 509	7944 ± 569
30 – 34	8474	8639 ± 165	8711 ± 237	8784 ± 310	8814 ± 340	8844 ± 370	8879 ± 405	8909 ± 435
35 – 39	8738	8843 ± 105	8918 ± 180	8998 ± 260	9038 ± 300	9073 ± 335	9113 ± 375	9148 ± 410
40 – 44	8647	8699 ± 52	8744 ± 97	8789 ± 142	8814 ± 167	8844 ± 197	8874 ± 227	8899 ± 252
45 – 49	8687	8723 ± 36	8783 ± 96	8838 ± 151	8863 ± 176	8888 ± 201	8818 ± 231	8943 ± 256
60 – 54	8668	8725 ± 57	8770 ± 102	8810 ± 142	8840 ± 172	8865 ± 197	8895 ± 227	8925 ± 257
55 – 59	8510	8570 ± 60	8607 ± 97	8645 ± 135	8675 ± 165	8700 ± 180	8730 ± 220	8760 ± 250
60 – 64	8180	8228 ± 48	8273 ± 93	8318 ± 138	8358 ± 178	8358 ± 178	8438 ± 258	8478 ± 298
65 – 69	7803	7844 ± 41	7904 ± 101	7969 ± 166	7994 ± 191	8019 ± 216	8044 ± 241	8069 ± 266
70 – 74	6944	7072 ± 128	7107 ± 163	7142 ± 198	7177 ± 233	7207 ± 263	7237 ± 293	7267 ± 323
75 – 79	5621	5743 ± 122	5803 ± 182	5863 ± 242	5888 ± 267	5913 ± 292	5943 ± 322	5968 ± 347
80 – 84	4395	4485 ± 90	4550 ± 155	4815 ± 220	4640 ± 245	4660 ± 265	4680 ± 285	4700 ± 305
85+	2068	2121 ± 63	2176 ± 108	2226 ± 158	2238 ± 170	2251 ± 183	2263 ± 195	2276 ± 208
				FEMALES				
15 – 19	672	718 ± 46	758 ± 86	803 ± 131	848 ± 176	888 ± 216	933 ± 261	978 ± 306
20 – 24	5445	5544 ± 99	5644 ± 199	5744 ± 299	5844 ± 399	5944 ± 499	6049 ± 604	6149 ± 704
25 – 29	8345	8473 ± 128	8543 ± 198	8613 ± 268	8683 ± 338	8748 ± 403	8818 ± 473	8888 ± 543
30 – 34	8722	8890 ± 168	8945 ± 223	9003 ± 281	9060 ± 338	9115 ± 393	9175 ± 453	9230 ± 508
35 – 39	8523	8643 ± 120	8708 ± 185	8768 ± 245	8833 ± 310	8598 ± 375	8958 ± 435	9023 ± 600
40 – 44	8286	8348 ± 82	8518 ± 232	8688 ± 402	8743 ± 457	8793 ± 507	8848 ± 562	8903 ± 617
45 – 49	7958	8059 ± 101	8164 ± 206	8264 ± 306	8317 ± 359	8369 ± 411	8422 ± 464	8474 ± 516
60 – 54	7370	7501 ± 131	7569 ± 199	7636 ± 266	7761 ± 391	7881 ± 511	7916 ± 548	7946 ± 576
55 – 59	6473	6638 ± 165	6738 ± 265	6838 ± 365	6943 ± 470	7043 ± 570	7093 ± 620	7138 ± 665
60 – 64	5334	5413 ± 79	5493 ± 159	5573 ± 239	5613 ± 279	5653 ± 319	6738 ± 404	5818 ± 484
65 – 68	4251	4282 ± 31	4337 ± 86	4392 ± 141	4432 ± 181	4472 ± 221	4512 ± 261	4547 ± 296
70 – 74	3039	3076 ± 37	3121 ± 82	3161 ± 122	3206 ± 167	3246 ± 207	3266 ± 227	3281 ± 242
75 – 79	2199	2218 ± 17	2241 ± 42	2261 ± 62	2241 ± 42	2321 ± 122	2341 ± 142	2356 ± 157
80 – 84	1143	1115 ± 29	1115 ± 29	1121 ± 35	1141 ± 55	1161 ± 75	1176 ± 90	1191 ± 106
85+	483	479 ± 5	484 ± 10	494 ± 20	507 ± 33	519 ± 45	529 ± 55	539 ± 85

TABLE 11.13 Tayside Population Projections: Headship Rates, Estimates (1961–66) and Projections[1] (1971–2001) (percentages)

Age Group (years)	*1961*	*1966*	*1971*	*1981*	*1991*	*2001*
			Married Men			
15 –64	100.0	100.2±0.1	100.4±0.2	100.9±0.4	101.4±0.5	101.9±0.7
65+	94.2	94.7±0.2	95.2±0.4	96.4±0.7	97.4±1.1	98.5±1.4
			Single, Widowed, Divorced Men			
15 –64	16.7	18.2±0.5	19.7±1.0	22.7±2.0	25.7±3.1	28.7±4.1
65+	55.3	56.3±0.3	57.3±0.7	59.3±1.4	61.4±2.1	63.5±2.7
			Single, Widowed, Divorced Women			
15 –59	23.7	24.8±0.4	25.9±0.8	28.2±1.5	30.4±2.3	32.7±3.0
60+	59.5	60.7±0.4	61.9±0.8	64.1±1.6	66.5±2.3	68.8±3.1

Note 1. Some allowance for multiple house ownership was allowed for in the headship rate projections.

1. The increases of population in Tayside examined in this Study obviously depend upon increases in the number of jobs in the region. Such increases are chiefly affected by economic policies designed to encourage industrialists and others to invest within Tayside. But jobs have to be filled by people of appropriate skills; and since social and psychological factors as well as purely economic factors affect the movement of labour into, and its retention within a region, it is necessary to take these factors into account.

2. Population increase can be secured either by attracting people into the region or by inducing them not to emigrate from it. However, such inducements cannot possibly eliminate gross emigration. In a developing economy, the mobility of labour – and especially of highly skilled labour – is likely to increase as the scale of economic integration grows, as an increasing percentage of the labour force enters white-collar employment and as communications improve not only within Britain but between Britain, the Continent and the USA. And, even if the outflow of people from Tayside can be restrained, policies will also need to be devised to induce people to move into the region.

3. Such policies require an understanding of the social-structural characteristics and motivational aspects of population movement. Research in this particular field, however, has been very meagre. Until quite recently, work was chiefly directed to the *ex post* analysis of inter-regional mobility and the distance and direction of movement. Certainly, the recent publications of the North Regional Planning Committee have begun to furnish data of a kind more suitable for sociological analysis.[1] For the present Study, however, a survey was carried out in order to discover the social-structural factors that might account for recent mobility into Tayside and neighbouring areas.

4. Given limitations upon time and money, the survey was conceived as drilling three bore-holes into the social structure of the region. They were selected so as to provide information about labour mobility in three different sectors, *viz:*

(a) Glenrothes, a new town just outside the region, into which people had moved with Government backing;
(b) two branch factories of major manufacturing companies, one the British branch of a large American company and the other a small branch of a British one; and
(c) the national headquarters of a large office organisation.

In drawing conclusions from the data collected, the smallness of the sizes of the samples should be emphasised as generally qualifying the results.

5. Details of the interviewing programme are given in Table 12.1. In the New Town, the interview list comprised a quasi-random sample of households which had moved to Glenrothes from the West of Scotland or from outside Scotland since January 1966; in the industrial firms it comprised all employees who had joined the pay-roll since that date; and in the office organisation all those who had joined the headquarters office since October 1966. Interviews conducted at the place of employment were with a specific employee. In the New Town, an effort was made to interview both the head of household and his wife, but in many cases it was possible to see only the wife, who provided information on behalf of her husband. In the event, not everyone listed could be interviewed, since some refused, others had left the town or the firm, and others were on holiday. In the circumstances, the fact that 73 per cent of the sample were interviewed makes possible an adequate, though not entirely satisfactory, analysis

The Results of the Local Survey

6. Tables 12.2 and 12.3 show the age and social status of our sample. Comparable, but not equivalent, data for Scotland indicate that the mobile section of the population is younger and of higher status than the population as a whole.

7. A comparison is presented in Table 12.4 of where the people in our sample were living before moving to Tayside or Glenrothes and also before leaving school. The sample for Glenrothes was drawn from long-distance movers from the West of Scotland or outside Scotland, and such people constitute in Glenrothes only 20 per cent of all incomers. We are dealing therefore with a minority. But, of this minority, it is significant that 58 per cent were moving into Scotland from England or abroad. Furthermore, since two thirds of the Glenrothes

TABLE 12.1 Results of the Interviewing Programme

	(1) *No. listed for interview*	*(2)* *No. Interviewed*	$\frac{(2)}{(1)}$ %
Glenrothes New Town	154	133	86
Industrial Firms	113	63	56
Office Organisation	34	24	72
	301	220	73

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[1] *Mobility and the North*, North Regional Planning Committee, 1967, and *The Mobility of the Northern Business Manager*, J.W. House *et. al.*, University of Newcastle, May 1968.

TABLE 12.2 Comparison of Age Distributions

Age	*Under 30* %	*30–39* %	*40–49* %	*50 and Over* %
Glenrothes New Town (head of household)	33	35	11	21
Industrial Firms (employees)	33	49	9	9
Office Organisation (employees)	64	25	8	13
SCOTLAND 1961				
Males, married widowed or divorced	15	22	22	41

TABLE 12.3 Comparison of Socio-Economic Groups

	Socio-Economic groups		
	1–4 %	*5 and 6* %	*Others* %
Glenrothes New Town (head of household)	21	29	50
Industrial Firms (employees)	36	19	45
Office Organisation (employees)	54	46	0
SCOTLAND 1961			
Employed males	11	17	72

Note. The Registrar General's classification of socio-economic groups, in which non-manual workers are groups 1–6 and 13, the other groups containing manual workers.

sample were living in Scotland when they left school, it is probable that many – possibly even a majority – of these incomers from England or abroad were in fact repatriate Scots.[1] Though this finding is based on only a very small sample, its significance is increased by the fact that it was independently corroborated by both the industrial and office inquiries; and this clearly has considerable significance for policy since it indicates, if only on the margins, a counter-movement to the predominant drift south out of Scotland.

8. As Table 12.5 shows, the major reason for moving was occupational. The predominant importance of this factor, however, should not obscure the fact that domestic and environmental considerations were also of primary significance for a substantial proportion of the immigrant population. Furthermore, the significance of different reasons for mobility varies in different parts of the social structure. Thus, remembering that the numbers involved were small, Table 12.6 indicates that managerial and professional workers moved almost exclusively for occupational reasons but that the importance of environmental and domestic reasons increases among employees in intermediate occupations and still more sharply among manual workers. It is also clear (Table 12.7) that younger men are more likely to move for occupational reasons though, even among them, this is never the sole reason.

9. For most people who moved into Tayside in the industrial and office samples, the move entailed a change of firm (72%) and for half (45%) a change in the kind of work to which they were accustomed. In Glenrothes changes of these kinds were less pronounced (58% and 28%, respectively) possibly because more people moved there under officially-sponsored schemes for attracting skilled workers or with their firms. It is clear that financial inducements to move are important since 65% of the industrial and office samples got salary or wage increases, though this did not necessarily entail promotion. Moreover, the survey showed that people who moved for occupational reasons are also likely to expect to move again in the future.

10. Analysis of the Glenrothes data, however, shows that people moving there for occupational reasons were less likely than people in the industrial and office samples to have had salary increases or promotion. It may well be, therefore, that moves to the New Town were more affected by a desire to improve housing or location while movement by people in private houses is more likely to be made in pursuit of specific financial or status rewards.

11. Most incomers expressed a high degree of satisfaction with their move to Tayside or Glenrothes: 90% among the industrial and office sample, and 72% in Glenrothes. Some informants even expressed the view that it had proved better than they had expected. Both samples point up the fact that the greatest expressions of dissatisfaction were found among households containing children under five years of age. In Glenrothes, for example, 37% of people in this category regarded their situation as worse than they had expected before they moved. Conversely, the highest degree of satisfaction in Glenrothes was found among professional and managerial employees.

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[1] The study of *The Mobility of the Northern Business Manager (op. cit)* showed that a significant proportion (25%) of persons moving in had been resident in the area before.

TABLE 12.4 Place of Residence Before Leaving School and Before Moving to Tayside or Glenrothes

Area	*Industrial firms and Office organisation (employees)*				*Glenrothes New Town (heads of household)*			
	residence before leaving school		*residence before moving to Tayside*		*residence before leaving school*		*residence before moving to Glenrothes*	
	%		*%*		*%*		*%*	
Tayside/Fife	22	65%	7	38%	22	66%	Excluded	
Clydeside	21		18		27		34	42%
Elsewhere in Scotland	22		14		17		8	
Elsewhere in UK	34		53		27		38	
Abroad	0		8		6		19	
No Answer	1		0		2		1	
Totals	100		100		100		100	

TABLE 12.5 Primary Reason for Moving

Reason	*Industrial firms and Office organisation*	*Glenrothes New Town*
	%	*%*
Occupational	61	47
Better house, nicer place	21	37
Domestic and other	18	16
Total	100	100

TABLE 12.6 Status, and Primary Reason for Moving

Reason	*Socio-economic Groups*		
	1 – 4 (managerial, professional)	*5 and 6 (intermediate)*	*7 – 11 (chiefly manual)*
	%	*%*	*%*
Industrial and Office			
Occupational	82	52	40
Environmental	13	19	32
Domestic	5	29	28
Total	100	100	100
Glenrothes			
Occupational	87	75	24
Environmental	4	19	54
Domestic	9	6	22
Total	100	100	100

TABLE 12.7 Age and Primary Reason for Moving

Reason	*Industrial firms and office organisation*		*Glenrothes*	
	Males under 40	*Males over 40*	*Heads under 40*	*Heads over 40*
	%	*%*	*%*	*%*
Occupational	75	61	53	36
All others	25	39	47	64
Total	100	100	100	100

12. These differences show no correlation with whether or not a household had wished to move from its previous residence, but they were related to whether the household had considered alternatives to moving to the New Town. Thus, only 13% of those who had done so were dissatisfied as against 28% of those who had not considered alternatives. Clearly, such attitudes have an effect upon the stability of a population, for the dissatisfied are more likely to wish to leave the area to which they have moved.

13. The comments made about the reasons for satisfaction and dissatisfaction with the move to Tayside show that there is a widespread appreciation of educational provision and of the natural amenities of the area such as the hills and the beaches and the healthy environment, even among those who expressed substantial dissatisfaction. The major objects of complaint were the shopping, entertainment and cultural amenities and the public transport service. Even when people are favourably disposed towards their house and its location, these complaints are made, and they are still more vigorously made when aggravated by dissatisfaction with housing.

14. Thirty per cent of our samples were Scots who had returned directly to Tayside or Glenrothes from outside Scotland. Most had returned because they were homesick for Scotland or wished to be nearer their kinsfolk; others came back because they had been attracted by a particular job, and others for health reasons or because housing was more easily obtained north of the Border. Their statements about satisfactions and dissatisfactions were little different from the general.

Sociological Implications

15. Though, overall, occupational factors are the primary grounds for mobility, they were overwhelmingly significant only among socio-economic groups 1–6 who constitute about a third of the labour force, while environmental and domestic reasons were much more significant among manual workers. This regularity in these data indicates that, though we are dealing with individual attitudes which may be thought to be insubstantial, they are related to social-structural characteristics which are much more tangible and durable and of greater predictive value. The point is the more compelling when it is noted that the data collected in this inquiry are fully consistent with those derived from other studies. The report on *Mobility and the North*, for example, pointed up a distinction between 'home-centred' and 'area-centred' mobility. In the former, the reason for movement had to do with the unsuitability of the dwelling, in the latter with employment opportunities and accessibility of work and amenities. Home-centred moves tended to take place within a much more restricted area than was the case with movements that were related to employment. The latter movements were shown to be correlated with higher status, and were particularly noticeable among 'administrators and managers' and professional and technical personnel. Thus, the distinction is established between, broadly speaking, the professional middle-class, whose moves are more likely to be for occupational reasons and inter-regional, and the manual working class, whose moves are more likely to be within the locality and home-centred.[1]

16. The social-structural basis for these differences is the distinction which can be made between jobs and careers. These are characteristic of particular socio-economic groups; managerial-professional personnel have careers, manual workers, on the other hand, have jobs. To have a career is to have an occupation in which what one does at one stage tends to count as a stepping stone to the next higher stage and in which employment opportunities cover the country as a whole. To have a job, on the other hand, is to undertake an occupation in which one job succeeds the previous job without any assumption or expectation that it will pave the way to advancement or that one will move freely from one town to another in pursuit of employment. Jobs, furthermore, are generally less well paid; so that persons in jobs – mainly manual workers – are more likely to be affected adversely by the constraints of the housing market since they have less choice of where they will live. Managerial and professional workers are more likely to be able to afford good housing, reasonably adapted to their needs, and move therefore chiefly to advance a career, while manual workers move predominantly in order to improve their housing or environment.

17. Again, the generally high degree of satisfaction which was found among our informants is not unexpected, nor is the fact that this is quite uncorrelated with whether or not the household wished or did not wish to leave its previous place of residence. Such empirical evidence as is available suggests that people are pretty adaptable and are disposed, having made a move, to put the best face upon it, and, after an initial period of social adjustment, to find new satisfaction in their new places of residence.

18. That the degree of satisfaction would be related to whether or not the household had considered other alternatives to moving to Tayside was suspected. But there are no other data on this point; nor is it strongly validated in this inquiry. But it is intelligible that if people have a sense that they have made a deliberate choice to move to an area, they will be more inclined to seek for satisfaction within it than if they moved by necessity.

19. Sociologically, choice in such matters is likely to be more general among the better-off, and especially the middle class. Not only are they more favourably located in the housing and employment markets, but they are more accustomed to deliberate upon alternatives open to them. The comparatively well-to-do are also able to deploy their own financial resources so as to be less dependent upon public facilities, such as public transport, which is a source of complaint for those without cars, (not only of course, in new towns). The well-to-do, therefore, are more likely deliberately to decide to move and thus to find the situation satisfactory. The less well-off, on the other hand, are more likely to have to move without effective choice and are less able to use private resources to assist them to accommodate to new circumstances.

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[1] *Op cit.*, pp. 51, 57, and 101 ff.

20. It is significant that dissatisfactions were particularly acute among manual workers' families at the early phases of the domestic life-cycle when the strain on the family budget is greatest and the chances of buying a car, for example, are low. Such families with young children are more dependent upon public services such as transport, which on all sides was the subject of complaints. The objective circumstances in which moves to a new area are undertaken, therefore, may be much less favourable for one social group than for another.

21. It is assumed to be desirable on both social and economic grounds, for a population, once recruited, to be stable: to remain — at least for some reasonable period of time — in the same area. The diseconomies of frequent changes in the staffing of offices and workplaces, with the necessity for new employees to be recruited and fitted into a business, if not partially retrained for its specific demands, are well known. And since people are put under greater social and psychological strain in the initial phases of readjustment to new situations, it is evident that a high degree of mobility gives rise to social costs in the context of readjustment as well as other social costs.

22. Briefly, the implications of the foregoing analysis are as follows. Professional-managerial employees are likely to be more satisfied with their move into a new area but to be more likely to move again in order to further their careers. Manual workers are rather less likely to be satisfied, if they are restricted by poor public services, but are less likely to move away for economic reasons. Thus, theoretically, there is a danger that there may grow up in any new development a substantial and relatively enduring element of working class discontent, derived principally from those who at any time find their opportunities severely restricted by dependence upon inadequate public services. Public policy needs to be directed to minimising this discontent, and to inducing the middle class to remain as long as possible in the new area by developing amenities to which they are likely to be particularly sensitive.

Longer Term Social Trends

23. The major variable in this analysis thus far has clearly been social class. This is, in effect, the critical link between economic and social forecasting. For long-term regional planning, changes in social class composition are of major importance, since so many attributes of a population are correlated with it. Social class structure varies according to the structure of occupations and that, in turn, varies with the nature of the economy. The major division is that between manual and non-manual workers. The proportions of a labour force that fall in each of these categories vary by industry. In mining and quarrying in 1961, for instance, less than 9% of total employment was in administrative, clerical and technical occupations; in insurance, banking and finance, conversely, the corresponding figure was nearly 90%. Furthermore, as the pattern of employment changes over time, with primary industry declining and tertiary industry increasing in importance, occupational shifts take place which affect the social class structure. If we can estimate the probable direction and magnitude of the changes that are likely to take place in the economy of a region then some indication might be given of the social implications which will need to be taken into account in a long-term regional plan.

24. In terms of Department of Employment and Productivity statistics the distinction between manual and non-manual labour is that between occupational groups 1—4 (proprietors, managers, administrative and executive staff; professional, technical, clerical and allied occupations) and groups 5—7 (skilled, semi-skilled, and unskilled manual occupations). In terms of Census of Population data, the distinction is between socio-economic groups 1—6 and 13 (non-manual) and the other groups (manual).

25. The 1966 Sample Census for the major part of the population of Tayside (Dundee, Angus, Perth, Perthshire) shows that about 29% of the economically active males over 15 years of age were within the non-manual socio-economic groups. The comparable ratios for Scotland and Great Britain were 27% and 32% respectively; and the ratios in the four named areas were 26% for Dundee, 27% for Angus, 40% for Perth, and 33% for Perthshire (excluding Perth). It is impossible to estimate, with any expectation of accuracy, long-term changes in such ratios. It is, however, very highly probable that the proportion of non-manual workers will increase substantially. This will be due to two factors: (a) a change in the distribution of employment among industries (the industry effect) and (b) a change in the pattern of employment within individual industries (the occupation effect).[1] The ratios would also be affected by any large increase in the Tayside population.

26. The industry effect which is attributable solely to changes in the relative sizes of industries, is likely to be substantial within Tayside as in the rest of the country. Even if the same number of people were in employment in Tayside in 2001 as in 1967, the number employed in non-manual jobs is certain to be much higher than at present. A material part of this would be due to growth in service industry employment. Non-manual workers account for an appreciably higher proportion of employment in service industries than in other industries, and the relative growth of the demand for services is an established and continuing phenomenon in advanced economies. The proportion of total employment in Tayside which falls within the service industries (rather less than 50% in 1967) will increase significantly in the future and this, together with other shifts between industries will substantially increase the number employed in professional, managerial and other non-manual jobs.

27. The occupation effect is likely to be no less substantial. It has been so in the recent past. Indeed, the Manpower Studies Unit concluded that 'whilst different rates of employment growth among industries (in the period 1951—61) have had an influence on the occupational pattern of the economy, a stronger influence was the fundamental change in the occupational structure of individual industries'.[2]

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[1] See *Occupational Changes, 1951—61*, London: Ministry of Labour Manpower Studies No. 6, 1967, p. 15.

[2] *Op cit.*, p. 16.

28. In the country as a whole, between 1951 and 1961, administrative, clerical and technical occupations increased their proportion of total employment in all the major classes of industry. The changes were from 23.5% to 31.4% for primary industry, from 17.4% to 22.6% for manufacturing, from 12.2% to 17.4% for construction and public utilities, and from 42.1% to 46.3% for the remaining service industries.

29. The industry and occupation effects combined to reduce the proportion of manual workers in the UK labour force from about 71% in 1951 to 66% in 1961 and to increase the proportion of non-manual workers from about 29% to 34%.[1] The shift was the more significant in that it took place over a period in which the labour force itself increased by 7%. The trend is continuing: in manufacturing, for example, administrative, clerical and technical occupations increased their proportion of total employment from 22.6% in 1961 to about 27% in 1968.[2] There is no reason to suggest that Tayside is not sharing in these trends, which are likely to continue.

30. Even if the number of employees in Tayside remained at the present level of about 175,000, the number of non-manual jobs would increase beyond the current 60,000 or so. The industry and occupation effects might, on a very rough estimate, take it to 80,000 or so by 2001. If Tayside population increased by +300,000 by the end of the century, the number of employees in the larger population of about 750,000 is estimated to be of the order of 300,000. Within that total, the number of non-manual jobs might be even more roughly estimated at 125,000 to 140,000. These figures suggest that the maximum growth envisaged entails an increase in the total non-manual, that is to say largely 'middle-class' population from less than 150,000 in the 1960s to over 300,000 in 2001. Whatever the actual figures, and the estimates given are only the crudest orders of magnitude, there will certainly be a substantial increase in the non-manual population.

Implications of these Trends

31. The significance of this class for the economic development of the region is greater than these crude figures indicate. For the growth and development of industry – and especially of tertiary industry – is critically dependent upon this type of labour, and this is likely to become increasingly true in the future. It is therefore evident that the needs of this category of the population are likely to be of increasing importance in the planning of the region for the next 30 years.

32. The first point that is significant for planning policy designed to foster their movement into, or their retention in the area, is that they are coming increasingly to attend to environmental factors in residential location. Thus, with an increasing proportion of the labour force in higher status employment, better educated and with a higher level of income, it becomes possible for this type of employee to judge employment opportunities, marginally at least, in terms of more than purely occupational benefits: in terms of amenity not only for the chief salary-earner but for his wife and children as well. This has been described as 'the revolution of rising expectations'. Hence, the quality of the physical environment and of cultural and other amenities is likely to be proportionally more influential in labour mobility in the future, though of overwhelming importance in perhaps only a minority of marginal cases.

33. The report on *Mobility and the North* provides ample evidence of this phenomenon. It applies in the first instance to people who moved *within* the area studied. As the report states: 'The 'revolution of rising expectations' is expressed very strongly in the reasons mentioned by internal-migrants, not only in terms of housing requirements (primarily amenities and space within their homes, also garden and garage facilities), but also in their appreciation of wider environmental conditions. This conclusion is particularly true of the higher status groups.'[3] The point can be elaborated by reference to another study which showed that these environmental considerations were even more important for managers who were moving North from *outside* the region than for those who moved only within the region, since they were able to compare the amenities of the North with those of other areas which were often better adapted to their requirements. 'In fact', states the report, 'these managers who have lived outside of the North for some time valued its physical assets most highly but were more critical of its social and cultural amenities.[4] Thus, this report confirms the general increase in importance of 'wider environmental conditions' noted so clearly in *Mobility and the North.* And it is able to support the conclusion that 'the importance of environmental attractions to an incoming migratory elite is therefore clearly substantiated'.[5]

34. Several hints are contained in Professor House's report about the *kinds* of environmental factor that may be important for this managerial elite. Thus, though educational considerations were not significant in most managers' decisions about whether or not to move, there was a 'type of manager more significant in the in-migrant group who is more sensitive to deficiency in educational facilities'.[6] This was a statistically insignificant phenomenon which may be explained by the fact that the in-migrant manager is able to draw wider comparisons between Northern educational facilities and those in different regions. On the other hand, particular *kinds* of manager – and conceivably those associated with growth industries – may well be particularly sensitive to such factors.

35. The significance of these environmental factors is likely to be the greater in that the same inferences are being drawn elsewhere. As the North Region Planning Committee has noted in its report: 'Environmental improvements should also play a significant part in attracting in-migrants and keeping down the volume of out-migration, particularly so far as 'middle class'

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[1] *Op. cit.*, p. 15.
[2] According to the latest available DEP figures.
[3] *Op. cit.*, p. 77.
[4] *The Mobility of the Northern Business Manager*, p.38.
[5] *Mobility and the North*, p.71.
[6] *Ibid*, p 65.

migrants are concerned, but, of course, it must be remembered that other regions of the country are concerned at the same time to improve *their* environments. Only changes in the *relative* fortunes of regions will produce significant differences in migration patterns'.[1] Thus, it is necessary to consider whether Tayside offers an environment that might induce labour, particularly of the professional and technical kind, either to move to the region or to remain there.

Dundee as an Urban Centre

36. The main issue here is the role of Dundee as an inducement. It is, and will remain, the major urban settlement in Tayside if only because of its present dominance and of the concentration of more than half the population of Tayside in its vicinity. Nevertheless, Dundee does not yet have the 'feel' of a major city which could attract people to move there as a good place to live. This view, though impressionistic, appears to be widely accepted, if less rarely expressed. But in the course of the survey, the comment was made that Dundee was 'betwixt and between' — neither a small town like Forfar, nor yet a genuine city like Edinburgh; and it was also noted that it was not large enough to create an effective demand for many significant cultural activities.

37. Yet the character and vitality of a town is not simply a matter of size. For the difference between Dundee and Aberdeen — towns of similar size but with very different 'tone' — is more plausibly explained by their very different socio-economic structures and histories. Aberdeen, from mediaeval times was a commercial city with a high measure of commercial self-government and an ecclesiastical and university city of long standing. Dundee developed from a different heritage, growing spectacularly in population from 38,000 in 1821 to 158,000 in 1881. The rise in the early part of this period was related to the prosperity and expansion of the Scottish linen industry, and from the middle of the century expansion was associated with the mushrooming jute industry. The rate of growth in Dundee had eased considerably by the end of the century, since which time population has been almost static in the range 180,000–190,000.[2] Dundee's major development was, therefore, a response to the requirements of industry, largely uninfluenced by any wider and less utilitarian considerations.

38. Cities of that kind, shaped essentially by rapid nineteenth century industrialisation, do not readily attract the new managerial elites who are particularly sensitive to environmental factors in deciding whether to take this job or that. Certainly, there are many environmental advantages in Tayside which are appreciated by people who have moved there. But they are advantages that relate to easy access to seaside and countryside and not to social and cultural amenities, and there is reason to expect that these particular deficiencies would be particularly sharply felt by executives with experience of other areas. Such deficiences could, therefore, be a serious handicap to any policy for economic development in this part of the country.

39. Dr DCD Pocock of the Department of Geography, Dundee University, has shown, in a survey undertaken on our behalf, that these subjective judgements can be objectively validated. His main analytical tool is an index of centrality. This is calculated by taking the number of outlets for any function in a given town as a percentage of the total number of outlets for that function within the region as a whole. Our 'total centrality index' is the average of the separate values for ten specific functions. Thus, whereas Perth, with 9% of the population, has a centrality value of 17%, Dundee, which has 41% of the regional population has only 30% centrality. This simply means that Dundee does not play a regional role commensurate with its size, whereas Perth plays a role comparable to that which could be statistically expected of a town with twice its population. And this obtains notwithstanding the favourable location of Dundee with the centroid of Tayside's population lying within the City boundary.

40. Dundee's weakness in regard to amenities is indicated by the following facts. The Dundee repertory theatre seats only half as many people as Perth's and it is less well sited and less suitably designed. The swimming baths in Dundee were built nearly a hundred years ago; the pool in Perth dates from the late thirties. Though Dundee and Perth both entertain the Scottish National Orchestra, the Scottish Opera and certain other cultural activities prefer Perth as a venue. Perth has a recently-opened covered sports stadium, Dundee has not. Finally, Perth can offer total hotel accommodation equal to that of Dundee and is the better known conference centre.

41. Among environmental factors, a particularly significant role is played by cultural amenities. There is already a viable repertory theatre in Dundee though it is badly housed and the City's Caird Hall though in need of renovation to make it more adaptable to modern requirements and standards of performance, is a valuable asset. The Scottish Arts Council recently felt able to contribute £300,000 — a 50 per cent contribution, the highest it has ever made — towards the improvement of the Caird Hall. Although no precise assessment has been made of the potential audience which a renovated hall might attract exciting new or renovated older buildings often constitute an attraction in their own right. Given the comparative underprovision of cultural amenities in the City and of the significance of such amenities in making Tayside, and Dundee as its main urban centre, a more attractive place to which people will be ready to move, such initiatives have an important part to play in the economic as well as the social development of the region.

Summary of Conclusions

42. Policy proposals cannot be derived directly from a small and limited survey. The findings are slight; policy entails value judgements; and these data clearly need to be taken into account with other information. But with these qualifications, the main implications for planning policy that are suggested by the survey data can be noted.

43. In the recent past, a significant proportion of long-distance immigrants to Tayside and Glenrothes have been repatriate Scots. A similar phenomenon has been noted in studies of mobility in the North East of England. Given the cultural and social differences north and south of the Border it is probable that many Scots people would prefer not to emigrate. Then (a) if policy is directed to inducing movement into Tayside from the south, the publicity for this might deliberately seek to encourage Scots to return, though this would have to be done in such a way as to avoid chauvinism; (b) if it was intended to restrain emigration from the region, these data give some ground for believing that this might well be congruent with Scottish sentiment.

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[1] *Mobility and the North*, p.80.

[2] Cf. H.R. Jones, 'Population', in *Dundee and District*, ed. S.J. Jones, B A.A.S., Dundee, 1968.

44. The differentiation between mobility which is primarily based on occupational and that which is primarily for environmental or domestic reasons suggests that the inflow into the area of managerial and professional staffs will be chiefly dependent upon the introduction of opportunities for career-oriented advancement, while that of manual workers will be influenced more by factors that have to do with the balance of advantage in respect to housing in Tayside as compared with their area of residence. Obviously manual workers will come only if there are also jobs for them to come to and executives will not be insensitive to the environmental factors: so that *both* need to be considered jointly at every stage of planning.

45. The anticipated increase in non-manual workers together with the 'revolution of rising expectations' make it likely that the quality of the physical environment and of cultural and other amenities will be of much greater importance in inducing this category of labour to move in the future than at present. Particular attention needs to be given to the development of cultural amenities, notably in Dundee.

46. While most people will finally settle down in a new area a sizeable minority, especially of young working-class people with young families, may well be particularly badly affected if public amenities are not adequately developed. Care needs to be taken to provide such amenities for this group. On the other hand, if one of the chief complaints concerns public transport, this may well be alleviated in the next 20 years by the further extension of car-ownership. Even so, there will presumably remain a stratum in the population that will be particularly dependent upon public amenities and special attention should be paid to the provision of adequate public services for this group.

47. If satisfaction with a move is correlated with whether or not a household has considered other alternatives to moving to the place they finally chose, then it would be desirable to consider providing as wide a choice of residential location within the Tayside area as possible. The element of choice in this sphere is likely to be an increasingly significant factor in the future as the middle class increases. These two considerations argue strongly in favour of developing at least some of the smaller Strathmore towns in the region *pari passu* with the major centres of population. Such towns have a viable social capital and a distinctive environmental quality which could be the basis of a sound development which would afford variety of choice. This will be still more feasible in the future as communications improve within the peripheries of Dundee and Perth and car ownership becomes more widespread.

48. In publicising the benefits of the Tayside area for residence, attention should be given to the outdoor amenities such as hills, sea healthiness. With the possibility of growing congestion and urbanisation in the South, which can be foreseen in the next 20–30 years, these may well come to play a more significant rôle as inducements than at present; and this is more likely to be the case the better the development of internal air transport.

13 Employment

1. The purpose of this chapter is threefold; to describe the present structure of employment in Tayside and how it has changed since 1951; to examine the incidence of unemployment in the area; and to indicate likely future trends and requirements in labour supply and demand. The analysis is based on Department of Employment and Productivity estimates of the numbers of insured employees and of unemployed in the past 20 years. The chapter begins with a short description of the Region's economic background.

GENERAL FEATURES OF THE TAYSIDE ECONOMY

2. Before the second world war, unemployment in Tayside was well above the national average. In 1937, unemployment in Dundee was 22% compared with 16% in Scotland and 11% in Great Britain. This was attributable to a decline in the traditional textile industries which was not compensated by expansion of alternative employment. Since the war, there has been substantial diversification of industry, including the attraction of major new enterprises in the engineering and electrical goods industries, which has greatly improved the situation. Compared with a 1937 level of 28,000 unemployed, the worst postwar years in Tayside have been 1952 and 1958, with unemployment in excess of 9,000 and 5,500 respectively. More often than not, the number of unemployed has been below 3,500. In 1967, unemployment in Tayside was just below 3%, compared with over 3.5% for Scotland and 2.3% for Great Britain.

3. The unemployed labour force in the Tayside Region has fallen materially in the last two decades. Between 1951 and 1967, the number in employment (insured employees less unemployed) contracted from 180,000 to 170,000:[1] a reduction of 0.4% per annum. During the same period, employment in Great Britain rose by about 0.6% per annum. The decline in Tayside was concentrated on male employment; over the whole period the number of female employees remained more or less constant at about 70,000, although there was an increase of over 3,000 in 1961–62 and a reduction of just under 3,000 between 1966 and 1967. As in the rest of the country, most women employees in Tayside are in the service trades (62% in 1967), but there is a significant proportion (16%) in textiles. Male employment fell from 109,000 in 1951 to 100,000 in 1967; this has its counterpart in the proportion of males in the total of unemployed, which is consistently higher in Tayside than in Scotland and Great Britain.

4. The Tayside female activity rate is the highest for all the planning sub-regions in Scotland, and is obviously associated with the demand for female labour from the textile trades.

Incomes and earnings

5. Comprehensive data on incomes and earnings in Tayside are not available, but incomplete estimates have been derived from statistics published by the Inland Revenue. The Inland Revenue figure of total net personal incomes before tax understates the true level of personal income by something like a quarter. However, this is unlikely seriously to affect such broad comparisons as we have attempted to make; and to try to present a realistic picture, the figures quoted are based on the Inland Revenue figures raised by 33% in each case. On this basis, estimated personal income *per capita* increased in Tayside from about £250 in 1954/55 to £430 in 1964/65. In the same period the Scottish average went from £245 to about £430, and the UK average from £290 to £520. Broadly speaking, the level of personal incomes in Tayside legs behind the average level for the United Kingdom by about five years; in addition the rate of growth in Tayside has been lower than in the United Kingdom, so that the lag in prosperity has tended to increase.

6. Unadjusted Inland Revenue data may be used to compare the level of employment income in Tayside with the levels in other planning sub-regions in Scotland. In 1964/65, employment income per tax case averaged £800 for Scotland, the range extending from £820 in Glasgow and West Central Scotland to about £715 in the South West. Tayside came fourth of the eight sub-regions with an average of £755, the three sub-regions with higher average employment incomes being Glasgow and West Central Scotland (£820), Edinburgh and East Central Scotland (£810), and Falkirk/Stirling (£795). The improvement in Tayside's postition relative to Scotland, when comparison is made on the basis of personal income instead of employment income, is attributable to its above-average share of profits, investment income, and professional earnings.

7. The lower average income from employment in Tayside could be due either to an industrial structure biased towards industries with low national earnings, or to lower earnings in Tayside in comparison with national earnings in the same industries; or to a combination of both factors. It would have required a special survey of earnings in Tayside to determine the causes and their relative importance. However, from calculations which assume similar age and occupational structures in the manufacturing labour force for Tayside, for Scotland and for the United Kingdom, it appears that some part at least of the low average income from employment is attributable to the industrial structure of the Region. Other causes are the presence of a relatively large primary sector in Tayside, and a comparatively high proportion of females in the Region's labour force.

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[1] These figures exclude a small number of employees not allocated geographically: an estimate for Tayside in 1967 is about 5,000.

Population and migration

8. The twentieth century has seen a more or less unchanging level of population in Tayside, the area's natural increase being offset by continuing net emigration. Between 1961 and 1968 there was an average net outflow from Tayside of between 2,500 and 3,000 persons a year, divided more or less equally between overseas destinations and England. In the same period Tayside was in approximate migration balance with the rest of Scotland. Similar to the Scottish pattern, Tayside's net loss of population was concentrated in the younger age groups; 58% of the net loss was from the age group between 15 and 35, whereas only 26% of the total Tayside population was in this age group.

Location of industry

9. The maintenance of employment in the area has been a matter of special concern to postwar governments. Their main weapon has been the special protection given to the jute industry, which has been the principal source of manufacturing employment in Tayside over the whole of the postwar period. However, diversification and the attraction of new industry have always been regarded favourably by successive governments, and the Region currently has Development Area status. The most striking development in industrial location occurred immediately after the second world war, when The National Cash Register Company (Manufacturing) Limited, Timex Branch of the United States Time Corporation, and Veeder-Root Limited, established manufacturing capacity in the Dundee industrial estates. All three companies have grown to become substantial employers. Employment in all factories on the industrial estates has grown from 1,000 in 1948 and 4,000 in 1952 to 11,500 in 1966. But this expansion, dramatic in itself, has derived largely from the major companies who arrived twenty or so years ago. In recent years no large increases in employment, in Dundee and in Tayside, have been associated with new arrivals, and during the 1960s Tayside claimed relatively few of the industrial development certificates approved for Scotland.

EMPLOYMENT AND THE INDUSTRIAL STRUCTURE

10. In 1967 Tayside had approximately 170,000 persons in employment, consisting of 100,000 males and 70,000 females. Their distribution among the industries of the Standard Industrial Classification is shown in Table 13.1, where it is compared with those for Scotland and Great Britain. Tayside has a relatively high proportion of employment in the primary sector and, compared with Great Britain, low proportions in the manufacturing and service sectors (although its proportion of manufacturing employment is about the same as for Scotland). The proportions of employment in construction are similar for Tayside and Scotland, but both are notably higher than for Great Britain. Diagram 20 indicates the numbers employed in primary, manufacturing and service industries in each of the employment exchange areas of the Region.

Primary industry

11. Agriculture, forestry and fishing provide over 7% of Tayside employment. This high proportion is almost entirely due to agriculture which, in most of the employment exchange areas other than Dundee and Perth, accounts for 20–30% of the available jobs. Employment in forestry (less than 500) is concentrated mainly in the upland areas of Perthshire and Angus. Fishing has more than 600 employees, mainly in the employment exchange areas of Anstruther, Montrose and Arbroath. There is no coal mining in the Region, and employment in mining and quarrying was only 500.

Manufacturing industry

12. In 1967, two Industrial Orders were by far the most important in the manufacturing sector of Tayside; textiles with 20,500 employees, and engineering and electrical goods with 17,600 employees. These two groups combine to employ two thirds of all manufacturing workers in Tayside. In contrast, the two largest manufacturing Orders in Great Britain account for only 36% of total manufacturing employment, and the corresponding Scottish figure is only 39%. While it is to be expected that industry in a relatively small area will be more specialised than in a country as a whole, it is clear that manufacturing industry is very highly specialised within Tayside and that the economy of the Region is heavily dependent on movements in output and employment in only two manufacturing groups.

13. The principal textiles industry is jute, which provided about 70% of total Tayside employment in textiles in 1967. The Region is the only important area for the manufacture of jute products in Great Britain, with well over 90% of national employment in the industry. Within Tayside the industry is concentrated in Dundee with about 11,000 employees, the Forfar area coming next with about 2,000. Other textiles industries are spinning and weaving of flax, textile finishing, making-up of textiles, and carpets. Most employment in these other textile industries is also in the Dundee area.

14. The most important industries in the engineering and electrical group are office machinery, watches and clocks, textile machinery and accessories, other machinery, and metal-working machine tools. These are modern industries in the main, with good prospects for expansion. Within Tayside, the sector is again concentrated in Dundee which has about 14,000 employees, Arbroath coming second with well over 2,000. In the six other employment exchange areas with more than 100 employed in engineering and electrical goods, the total so employed is barely 1,300.

15. Other manufacturing Orders of note in the Region are food, drink, and tobacco, with 7,000 employees, and paper, printing and publishing, with about 5,000 employees. Both of these groups are relatively more important within Tayside than in Great Britain. The high Tayside percentage in food, drink and tobacco, is attributable to whisky blending and bottling, to the manufacture of confectionery and preserves, and to the processing of poultry, fruit and vegetables. In paper, printing and publishing, a large publishing concern in Dundee supplies national markets, and one firm in Fife manufactures quality paper.

16. All other manufacturing Orders have a smaller

proportion of total employment within Tayside than within Great Britain, the largest shortfalls occurring in vehicles and in chemicals.

Service industry

17. Employment in insurance, banking and finance, and professional and scientific services, is relatively more important for Tayside than for either Scotland or Great Britain. In the first of these sectors there is the head office of a major insurance company in Perth; in the second, there are universities at both St Andrews and Dundee, and colleges of art, technology, and education in Dundee. Among the remaining service sectors only transport and communications, in which a relatively low proportion is recorded, differs significantly from the national norm.

TRENDS IN EMPLOYMENT

18. A summary picture of the postwar movements in employment in Tayside is provided in Table 13.2. However, the significance of these trends is better assessed by setting them against the corresponding changes in Great Britain. This is done in Table 13.3, which expresses the regional changes in the form of ratios of Tayside employment to national employment. From this, it will be seen that Tayside's overall share of national employment fell from 8.6 per 1,000 in 1951 to 7.5 per thousand in 1967.

Primary industry

19. Employment in agriculture declined in Great Britain throughout the period 1951–67. Tayside shared in this general decline, with most of the reduction

TABLE 13.1 Employees in Employment by Industrial Order – June 1967

S.I.C. ORDER		*TAYSIDE*				*SCOTLAND*	*GREAT BRITAIN*
		Males	*Females*	*Total*	*%*	*%*	*%*
I.	Agriculture, Forestry, Fishing	10300	2000	12300	7.2	3.2	1.9
II.	Mining and Quarrying	500	–	500	0.3	2.6	2.4
Total	Primary	10800	2000	12800	7.5	5.8	4.3
III.	Food, Drink and Tobacco	3400	3600	7000	4.1	4.9	3.6
IV.	Chemicals and Allied Industries	400	100	500	0.3	1.5	2.2
V.	Metal Manufacture	700	200	800	0.5	2.4	2.6
VI.	Engineering and Electrical Goods	11900	5700	17600	10.4	8.8	10.2
VII.	Shipbuilding and Marine Engineering	1100	–	1100	0.6	2.3	0.9
VIII.	Vehicles	600	–	600	0.4	1.9	3.5
IX.	Metal Goods not elsewhere specified	600	300	900	0.5	1.2	2.5
X.	Textiles	10200	10300	20500	12.1	4.3	3.1
XI.	Leather, Leather Goods and Fur	100	–	100	0.1	0.2	0.2
XII.	Clothing and Footwear	200	700	900	0.5	1.5	2.2
XIII.	Bricks, Pottery, Glass, Cement	900	200	1100	0.6	1.2	1.5
XIV.	Timber, Furniture, etc.	1600	200	1800	1.1	1.2	1.3
XV.	Paper, Printing and Publishing	3000	1900	4900	2.8	2.7	2.8
XVI.	Other Manufacturing Industries	800	300	1100	0.6	0.8	1.4
Total	Manufacturing	35500	23500	59000	34.7	35.0	38.0
XVII.	Construction	13800	700	14500	8.5	8.8	6.7
XVIII.	Gas, Electricity, Water	2400	300	2700	1.6	1.6	1.9
XIX.	Transport and Communication	6700	1500	8200	4.8	7.3	7.1
XX.	Distributive Trades	8600	12000	20600	12.1	12.9	12.4
XXI.	Insurance, Banking and Finance	2500	2200	4700	2.8	2.2	14.2
XXII.	Professional and Scientific Services	7200	16200	23400	13.7	12.5	
XXIII.	Miscellaneous Services	6200	9500	15700	9.2	8.3	9.3
XXIV.	Public Administration and Defence	6000	2500	8500	5.0	5.7	6.1
Total	Services	39600	44200	83800	49.3	50.5	51.0
GRAND TOTAL[1]		99700	70400	170100[1]	100.0	100.0	100.0

Sources: Department of Employment and Productivity;
Employment and Productivity Gazette
Scottish Digest of Statistics.

[1] This understates the true figure by an estimated 5,000

occurring in the period 1961–67. But because the regional rate of decline was below the national rate for the period as a whole, Tayside's relative dependence on agriculture increased. Employment in forestry and fishing declined slightly between 1951 and 1967. The main reductions in fishing employment occurred in Montrose, which lost about 150 jobs, and in the Anstruther area which lost about 100.

Manufacturing industry

20. Total manufacturing employment in Tayside fell from 66,500 in 1951 to below 59,000 in 1967, an average annual rate of -0.7%, with most of the decline occurring in the period 1951–61. Over the whole period, Tayside's share of national employment in manufacturing fell from 7.8 to 6.8 per thousand. The contraction was the result of employment losses in textiles, and in a number of small industries; these combined to exceed gains in engineering and electrical goods, and in four or five smaller growth sectors. Growth in engineering and electrical goods has in fact exceeded the national rate, and has taken total employment from 11,800 in 1951 to 17,600 in 1967. Almost the whole of this increase occurred in Dundee. Employment in textiles fell from 29,200 in 1951 to 20,500 in 1967, with a reduction of 3,000 occurring in the last two years of the period. Over the whole period, most of the loss was in the employment of women; female employment fell by 6,900 while male employment fell by only 1,800. All areas in Tayside experienced some reduction, and Dundee lost 6,200 jobs in this sector over the eighteen years. In the jute industry, employment declined until in 1967 there were 14,300 employees compared with 18,200 in 1951.

TABLE 13.2 Tayside Employment, 1951–67

	S.I.C. ORDER	*1951*	*1956*	*1961*	*1966*	*1967*
I.	Agriculture, Forestry, Fishing	18400	17400	16800	14000	12300
II.	Mining and Quarrying	700	700	600	500	600
Total	Primary	19100	18100	17400	14500	12800
III.	Food, Drink and Tobacco	7900	7700	7200	7100	7000
IV.	Chemicals and Allied Industries	1200	800	800	800	500
V.	Metal Manufacture	600	1000	700	600	800
VI.	Engineering and Electrical Goods	11800	12800	14000	17400	17600
VII.	Shipbuilding and Marine Engineering	2500	2700	1600	1200	1100
VIII.	Vehicles	1000	1000	800	700	600
IX.	Metal Goods not elsewhere specified	600	600	900	1500	900
X.	Textiles	29200	27300	23900	23600	20500
XI.	Leather, Leather Goods and Fur	300	200	200	100	100
XII.	Clothing and Footwear	2200	1800	1200	900	900
XIII.	Bricks, Pottery, Glass Cement	600	600	700	800	1100
XIV.	Timber, Furniture, etc.	2400	1800	1700	1800	1800
XV.	Paper, Printing and Publishing	4300	4400	4600	4900	4900
XVI.	Other Manufacturing Industries	1900	1900	1500	1200	1100
Total	Manufacturing	66500	64700	59800	62500	59000
XVII.	Construction	13300	14300	12900	14100	14500
XVIII.	Gas, Electricity and Water	2500	2400	2600	2800	2700
XIX.	Transport and Communication	12000	11300	10400	9100	8200
XX.	Distributive Trades	18800	20300	23000	22600	20600
XXI.	Insurance, Banking and Finance	3300	3200	3500	3900	4700
XXII.	Professional and Scientific Services	16000	17100	19500	22600	23400
XXIII.	Miscellaneous Services	19000	17700	16300	17100	16700
XXIV.	Public Administration and Defence	9700	8600	7400	7500	8500
Total:	Services	81300	80600	82700	85600	83800
GRAND TOTAL[1]		180200	177700	172800	176700	170100

Source: Department of Employment and Productivity, June estimates.

1. These figures exclude small numbers of employees not allocated by region; an estimate for Tayside in 1967 is about 5,000

TABLE 13.3 Tayside Employment relative to Employment in Great Britain, 1951–1967

	S.I.C. ORDER	*Employees in Tayside per 1,000 employees in Great Britain*		
		1951	*1967*	*% change 1951–67*
I.	Agriculture, Forestry, Fishing	23.1	28.4	+13.4
II.	Mining and Quarrying	0.8	1.0	+25.0
Total	Primary	11.5	13.0	+13.0
III.	Food, Drink and Tobacco	9.5	8.5	–10.5
IV.	Chemicals and Allied Industries	2.5	1.0	–60.0
V.	Metal Manufacture	1.1	1.5	+36.4
VI.	Engineering and Electrical Goods	6.9	7.8	+10.1
VII.	Shipbuilding and Marine Engineering	8.4	5.6	–33.3
VIII.	Vehicles	1.3	0.7	–46.2
IX.	Metal Goods not elsewhere specified	1.2	1.6	+33.3
X.	Textiles	26.4	29.2	+10.6
XI.	Leather, Leather Goods and Fur	4.1	1.8	–56.1
XII.	Clothing and Footwear	3.2	1.8	–43.8
XIII.	Bricks, Pottery, Glass, Cement	1.8	3.2	+77.8
XIV.	Timber, Furniture, etc.	7.7	6.0	–22.1
XV.	Paper, Printing and Publishing	8.2	7.7	– 6.1
XVI.	Other Manufacturing Industries	7.0	3.3	–52.9
Total	Manufacturing	7.8	6.8	–12.8
XVII.	Construction	10.0	9.4	– 6.0
XVIII.	Gas, Electricity and Water	6.8	6.4	– 3.0
XIX.	Transport and Communication	7.0	5.1	–27.1
XX.	Distributive Trades	8.7	7.4	–14.9
XXI. XXII.	Insurance, Banking and Finance Professional and Scientific Services	10.0	8.6	–14.0
XXIII.	Miscellaneous Services	10.0	7.4	–26.0
XXIV.	Public Administration and Defence	7.0	6.1	–12.9
Total.	Services (including Construction)	8.6	7.2	–16.3
GRAND TOTAL		8.6	7.5	–12.8

Source: Department of Employment and Productivity

21. Four manufacturing Orders, in addition to engineering and electrical goods, increased employment in the period 1951–67. They were paper, printing and publishing (+600); bricks, pottery, glass and cement (+500); metal manufacture (+300); and metal goods (+300). The first of these failed to keep pace with national trends, but the remainder all improved their relative positions. In all other manufacturing Orders employment declined between 1951 and 1967. The larger reductions included shipbuilding and marine engineering (–1,400); clothing and footwear (–1,300); and food, drink and tobacco (–900). With the exceptions of chemicals and vehicles, those manufacturing industries which contracted in Tayside also reduced their employment in Great Britain over the period; but faster rates of decline were experienced in all cases in Tayside.

Construction and services

22. Although employment in construction rose by 1,200 in Tayside between 1951 and 1967, the rate of expansion over these years was less than in Great Britain. This was due partly to high levels of employment in the base year in hydro-electric construction schemes. However in the period 1961–67, Tayside's rate of growth in this sector was appreciably in excess of the national rate, due largely to an increased output of public housing.

23. Overall, Tayside's share of service employment (including construction) fell from 8.6 to 7.2 per 1,000 from 1951 to 1967. Nevertheless the largest growth in any employment category in Tayside occurred in professional and scientific services, which expanded from 16,000 in 1951 to 23,400 in 1967, an increase of 45%. This was associated with the growth of employment in education in the Region, in particular of employment in higher education. The Tayside growth rate for insurance, banking and finance combined with professional and scientific services was below that for Great Britain, although insurance, etc., as well as professional and scientific services, also enjoyed a substantial absolute increase. While employment in the distributive trades and gas, electricity and water increased, the remaining Tayside service industries declined between 1951 and 1967, the largest contraction taking place in transport and communications. Some of the reduction in this last case is attributable to the closure of railway workshops at Perth.

Analysis of employment trends

24. The changes in employment are analysed further to attempt to separate employment change into three components; national, structural and differential (see Table 13.4). A distinction is made between: (a) the employment change which the Region would have experienced if it had had the national rate of change of employment; (b) the change attributable to the Region's own particular structure of employment; and (c) the change attributable to the differential rates at which employment in each Order in the Region increased or

decreased compared with the rates for the corresponding Orders in the country as a whole. Thus, between 1951 and 1967 employment in Tayside declined by about 10,000. The analysis explains this as the net result of: (a) an increase of 16,000 due to the national increase of employment during the period, (b) a decrease of 8,500 due to Tayside's structural bias towards declining industries, and (c) a residual decrease of 17,500 attributed to below-average rates of expansion or above-average rates of decline in employment in industries in Tayside.

25. The two groups of industries mainly responsible for the structural component were agriculture and textiles, although in both groups the national rates of contraction were modified by below-average rates of decline in the Tayside parts of these industries. In engineering and electrical goods, consistent with national growth, a large prospective increase of over 5,000 in employment was reduced by 1,000 because the proportion of employment in the industries in Tayside was lower than average in the 1951 base period, but was increased by more than 1,500 on account of above-average rates of expansion in the Tayside sectors of the industries. In services, Tayside had a favourable structural bias in 1951 which, when combined with national growth in these industries, provided a basis for a significant expansion of employment; but most of this potential expansion was lost because of below-average growth in employment in the Region.

UNEMPLOYMENT

26. Unemployment rates in Tayside averaged 2.5% between 1960 and 1967; they were lower than the Scottish average of 3.4%, but higher than Great Britain's 1.7% (Table 13.5). These relative positions have persisted since 1960; and apart from 1960/62, Tayside unemployment has moved in line with national levels. Five employment exchange areas in the Region have higher average unemployment than Tayside as a whole: Anstruther, Blairgowrie, Dundee, Montrose and Arbroath. The averages of monthly returns of wholly unemployed in Tayside and in its exchange areas, for each year from 1960 to 1967, are given in Table 13.6. There are some striking variations between exchange areas, both in year-to-year fluctuations and in trends. Thus, the Dundee level in 1967 differed little from that in 1960, but

TABLE 13.4 Components of Employment Growth, 1951–1967

	S.I.C. ORDER	*Tayside 1951*	*Tayside 1967*	*Difference 1951-1967*	*National*	*Structural*	*Differential*
I.	Agriculture, Forestry, Fishing	18373	12290	–6083	–3121	–5257	2295
II.	Mining and Quarrying	686	527	– 169	–2671	2423	89
Total	Primary	18059	12817	–6242	–5792	–2834	2384
III.	Food, Drink and Tobacco	7904	6979	– 925	– 86	– 9	–830
IV.	Chemicals and Allied Industries	1226	460	– 766	275	– 193	–848
V.	Metal Manufacture	592	878	286	361	– 316	241
VI.	Engineering and Electrical Goods	11782	17604	5822	6175	–1047	1694
VII.	Shipbuilding and Marine Engineering	2628	1112	–1418	–867	10	–559
VIII.	Vehicles	984	637	– 347	378	– 322	–403
IX.	Metal Goods N.E.S.	616	884	268	490	– 421	199
X.	Textiles	29210	20528	–8682	–3456	–7179	1953
XI.	Leather, Leather Goods and Fur	347	55	– 292	– 147	66	–211
XII.	Clothing and Footwear	2157	876	–1281	–1710	1095	–666
XIII.	Bricks, Pottery, Glass, Cement	570	1065	495	86	– 69	478
XIV.	Timber, Furniture, etc.	2376	1815	– 560	– 77	8	–491
XV.	Paper, Printing and Publishing	4339	4883	544	820	– 37	–339
XVI.	Other Manufacturing Industries	1854	1062	– 802	516	– 105	–1213
Total:	Manufacturing	66495	58839	–7656	1858	–8619	–995
XVII.	Construction	13306	14541	1235	1847	302	–914
XVIII.	Gas, Electricity, and Water	2517	2737	220	473	– 97	–156
XIX	Transport and Communication	12049	8198	–3851	–1126	215	–2940
XX	Distributive Trades	18774	20577	1803	5469	55	–3721
XXI.	Insurance, Banking and Finance	3304	4662	1368)	11518	1891	–4656
XXII.	Professional and Scientific Services	15966	23361	7396)			
XXIII.	Miscellaneous Services	18976	15662	–3314	1718	266	–5297
XXIV.	Public Administration and Defence	9666	8458	–1208	95	– 18	–1285
Total	Services and Construction	94557	98196	3639	19995	2613	–18969
GRAND TOTAL		180111	169852	–10259	18061	–8740	–17680

Sources: *Ministry of Labour* Gazette. *Employment and Productivity Gazette;* Statistics from the Department of Employment and Productivity.

TABLE 13.5 Avarage Annual Unemployment Rates by Tayside Exchange Areas*

EXCHANGE	1960	1961	1962	1963	1964	1965	1966	1967	Average 1960 – 1967
Dundee	3.0	3.4	3.2	3.5	2.6	2.2	2.0	3.1	2.9
Perth	1.3	1.0	1.3	1.8	1.8	1.8	1.9	2.6	1.7
Arbroath and Carnoustie	2.5	2.2	2.8	3.4	3.0	3.1	2.6	3.0	2.8
Tayport and St Andrews	1.7	1.5	1.8	2.1	1.6	1.5	1.6	1.5	1.7
Forfar	0.9	0.8	0.9	1.1	1.1	1.0	1.4	1.7	1.1
Cupar	1.2	1.0	1.5	1.9	1.5	1.5	1.6	2.1	1.5
Montrose	2.5	2.2	2.3	2.8	2.6	2.9	2.6	4.1	2.8
Blairgowrie	2.9	2.9	2.7	2.9	2.9	2.1	2.8	3.6	2.9
Crieff	2.0	1.8	2.1	2.2	2.2	2.2	2.6	4.2	2.3
Brechin	2.5	1.4	1.9	2.4	2.2	2.2	2.4	4.2	2.4
Pitlochry	2.5	2.3	2.4	2.3	2.1	2.1	2.4	2.6	2.3
Anstruther	5.2	4.7	5.2	5.6	4.0	4.1	6.1	4.8	4.8
TAYSIDE	2.5	2.5	2.5	2.9	2.3	2.1	2.1	2.9	2.5
Scotland	3.5	3.0	3.5	4.4	3.6	2.9	2.7	3.7	3.4
Great Britain	1.6	1.4	1.9	2.3	1.6	1.4	1.4	2.3	1.7

* Unemployment rates are calculated as a 12-monthly average of wholly unemployed in each area expressed as a percentage of the June totals of insured employees

Source. Department of Employment and Productivity.

TABLE 13.6 Unemployment in Tayside – Annual Average Numbers of Wholly Unemployed

EXCHANGE AREA	1960	1961	1962	1963	1964	1965	1966	1967
Dundee	2756	3013	2990	3204	2419	2075	1859	2700
Perth	365	287	377	550	502	506	527	742
Arbroath and Carnoustie	256	234	299	366	315	312	265	296
Tayport and St Andrews	110	97	112	133	95	94	100	98
Forfar	82	84	80	97	98	94	125	152
Cupar	107	85	143	190	145	144	140	184
Montrose	185	158	173	217	197	206	185	275
Blairgowrie	150	145	139	157	148	115	143	178
Crieff	73	65	78	86	85	81	82	138
Brechin	107	63	84	104	95	92	99	146
Pitlochry	88	77	81	81	73	73	81	87
Anstruther	126	119	126	129	94	91	114	100
TAYSIDE	4405	4427	4682	5314	4266	3883	3730	5096
Males wholly unemployed	3299	3319	3501	4038	3268	3003	2956	4024
Males as percentage of total	74.9	75.0	74.8	76.0	76.5	77.2	79.2	79.0

Source: Department of Employment and Productivity.

unemployment in the worst year (1963) was greater by two thirds than in the best year (1966). Over the whole period, Perth, Crieff and Forfar show about twice as many unemployed at the terminal date as in 1960. Only in Anstruther was there signs of a downward trend.

27. A notable feature of Tayside unemployment is that the proportion of males in the wholly unemployed is consistently higher, at about 75–80%, than in either Scotland or Great Britain. On the other hand, given the high proportion of women employees and the substantial falls in female employment in textiles, the record does not show as much female unemployment as might have been expected. This is because, in Tayside as elsewhere, not all women leaving or losing jobs register as unemployed.

28. The absolute numbers of unemployed in any Tayside employment exchange area are not large. But the unemployment figures do not give a complete picture of labour availability. They include some people who would be unsuitable for new jobs even after training, and also some frictional unemployment. Thus, in 1967, realistic figures of labour available from the unemployed might have been about 3,000 for the Tayside Region with about 2,000 at Dundee, 400 or so at Perth, and less than 200 in all other exchange areas. There are, however, considerations on the other side. Labour available for a new or expanding company may come from the following additional sources: workers who would otherwise have become unemployed; workers who may be attracted from existing employment by better terms; in-migrants and potential out-migrants; and a reserve of persons who are potentially economically active, including unregis-

tered female unemployed. Thus the small absolute numbers of unemployed in Tayside, as elsewhere, understate the labour potentially available for new or expanding firms. This discussion of labour availability has been extended because we believe that at present, and for some years, the actual number of unemployed is likely to be a poorer indicator of labour availability in Tayside than in many other areas.

29. It is convenient here to comment briefly on possible future unemployment by areas. Agriculture and textiles are the sources from which unemployment is likely to arise in Tayside in the future. The areas most dependent on textiles are Dundee, Forfar, Arbroath, Brechin, and Montrose. In the case of agriculture, the areas round Perth, Forfar, Cupar, Montrose and Blairgowrie would be the most likely to suffer; of these, only Perth has a non-textiles industrial base of any appreciable size. On the other hand, in spite of the heavy job losses already experienced in agriculture, recent unemployment rates in the Perth, Forfar and Cupar areas have been below the averages for Tayside and Scotland. Perth and Arbroath will be affected by reductions in employment on defence services, and Cupar faces the early closure of its sugar beet factory.

PROSPECTS FOR FUTURE EMPLOYMENT

The future supply of employees

30. Estimates of the future levels of population within Tayside are given in detail in Chapter 11 (Population). For the present purpose, it is appropriate to confine our attention to five of these projections. The first two (IMHF 1 and IMLF 1) achieve the upper limit remit proposal of an additional 300,000 persons by the year 2001. The next two projections (IMHF 2 and IMLF 2) achieve the lower limit of an additional 175,000 by the end of the century. The final projection (EMHF 1) assumes continuation of high fertility and of the 1961–66 net levels of migration, and shows Tayside population falling by 6,000 by 1981 and 7,000 by 2001.

31. Estimates of the future supply of employees are calculated by applying employee activity rates to the Tayside population aged 15 and over for males and females separately. These calculations produce estimates of the number of employees in employment together with the unemployed. The activity rates used were based on estimates of future rates for 1981 for Great Britain (70% for males and 43% for females). We assumed that Scottish rates would be about the same in 1981, and that the Tayside rates would rise relative to the Scottish rates by 1981. The rates used for Tayside in 1981 were 68% for males and 42% for females, the male rate being rather less than in the middle 1960s and the female rate being higher. Both of these movements are in accordance with forecast national trends. It was not possible to base our Tayside estimates after 1981 on national forecasts. For males we assumed, without great confidence, that the activity rate might fall to 87% by 2001. For women, taking into consideration the demographic characteristics of a population that has an increasing component of immigrants, we assumed only slight further growth in the activity rate: at the 43% assumed it would be no higher than the forecast rate for females for Great Britain in 1981. This may be too low. A rate of 45% was used in the case of the no-growth projection (EMHF 1).

32. The estimates of employees resulting from these calculations, particularly those for 2001, are not presented with much confidence. One percentage point of difference in the activity rates used in 1981 would change the forecasts of supply by between 1,500 and 2,000 for men, and by about 2,000 for women. In 2001, a difference of one percentage point would change the estimates by 1,500–3,000 in each case. The estimates must, therefore, be treated with considerable reservetions. It seemed unnecessary to attempt to pursue a more refined approach, given the uncertainties surrounding the figures to which the estimated (or assumed) activity rates had to be applied: for example, a 1981 activity rate for men of 66% instead of 68% would reduce the supply of male employees by about 4,000 whereas the difference between projections IMLF 1 and EMHF 1 amounts to 20,000 male employees. The results of the calculations are given in Table 13.7.

33. In forecasting activity rates, the variety of social, cultural and economic factors influencing decisions by men and women to seek work as employees must be borne in mind: the increasing demand for higher education, the change in the school-leaving age to 16 in 1972, and the improving provisions for retirement pensions. For women, there are also the falling average age at marriage and smaller family size, which produce earlier withdrawal from, and earlier return to, the labour force. In addition, activity rates, especially those for women and older persons, are sensitive in the short run to fluctuations in the pressure of demand for labour. Growth in female activity rates, in particular, could be retarded if a significant shortage of jobs for men were to appear. In the longer term, female activity rates are affected not only by changes in employment opportunities but also by female rates of pay.

TABLE 13.7 Projections of the Supply of Employees, Tayside, 1981 and 2001

(Thousands)

Population projection[1]	1981 *Males*	1981 *Females*	1981 *Total*	2001 *Males*	2001 *Females*	2001 *Total*
IMHF 1	120	85	205	175	115	290
IMLF 1	125	85	210	185	120	305
IMHF 2	115	80	195	145	100	245
IMLF 2	120	80	200	155	105	260
EMHF1	105	75	180	105	75	180

1. IMHF 1 and IMLF 1 give a population increase of 300,000 by 2001.
IMHF 2 and IMLF 2 give an increase of 175,000.
EMHF 1 gives a fall in population of 7,000 by 2001

The demand for labour

34. In considering the future demand for labour in Tayside, two stages have been distinguished. During the 1970s, factors already discernible in the regional economy are assumed to have the major influence on employment. Then, during the 1980s and beyond, current trends are assumed to yield place to other factors as the principal determinants of the demand for employees.

35. In the short-term forecasts up to 1981, three methods of projection were used:

(1) a trend that assumed that the number of insured employees in each industry in Tayside would continue to change as it had done in the period 1951 to 1966;

(2) a trend that assumed that Tayside's share of national employment in each industry would continue to change as it had done in the period 1951 to 1966; and

(3) a trend similar to (2), but extrapolating from the period 1959 to 1966.

The estimates for Great Britain, used in projections (2) and (3) were based on those in *The British Economy in 1975* (W. Beckerman and Associates, Cambridge, 1965). The forecasts for the years 1976 and 1981, obtained by each of the methods, are given in Table 13.8.

36. According to the first projection, the demand for labour in Tayside will increase by a modest amount, by comparison with the numbers actually in employment in 1967, until 1981. According to method (2), gains in the earlier part of the period will be lost by the end; indeed, projections by this method beyond 1981 indicate further decline. Projection (3) is only a little more encouraging than projection (2). It is possible to rationalise the discrepancies between the three forecasts in terms of the different assumptions made. Briefly, method (1) compounds the rate at which Tayside's employment has shifted towards industries which are expanding nationally with the national rate of expansion in the same period. Methods (2) and (3) are influenced by assumptions of a slower rate of national growth in these same industries in the future. As between (2) and (3), we have evidence that the shift of Tayside employment towards growth industries has accelerated since 1959.

37. Projections such as those given above must be used with very great care. First, they do not allow for any local effects in Tayside (as distinct from Development Areas generally) of recent changes in regional assistance to capital and labour. Second, projections over a 15-year period, based on linear trends derived from observations of the previous 15 years, are unlikely to be very reliable in practice. In particular, simple reliance on the projections for the jute industry would be very misleading.

38. The conditions under which jute manufacturing in Tayside will be carried on in the future will become increasingly adverse. We may anticipate reductions in the level of protection, sharply increasing competition from substitutes, and continuing improvements in labour productivity. The combined effect of these forces, expressed as a rate of decline, is however extremely uncertain in timing and in magnitude. In fact, the forecasts for 1981 employment in Tayside in textiles, given in Table 13.8, are too high. Employment in jute, which was 14,000 in 1968, could be reduced by a third to a half in the next decade or so (see Chapter 14).

39. On the other hand, information gathered in our industrial survey suggests that the projections underestimate the growth of employment in engineering and electrical goods.

40. Forecasts of the demand for labour in regions that are only relatively small parts of a large economy may turn out to be very wrong, based, as they must very largely be, on existing trends and policies. In particular, any attempt to forecast demand beyond 1981 by simple extrapolation would be ill-advised. Thus it seemed best to merge short-term forecasting of the balance of demand and supply into a review of the jobs that would be required in the light of our remit and of the general economic potential of the Region.

41. Nevertheless it is appropriate to conclude this section by presenting, with many reservations, some forecast of how labour demand might behave in the 1970s. We think that the total of 72,000 jobs in the primary and manufacturing sectors in 1967 might, at best, be at the same level in 1976 and again in 1981. And the total of 103,000 jobs in construction and services in 1967 might still be the same in 1976, and rise to 105,000 in 1981. At best, the total quantity of labour demanded, which was 175,000 in 1967, might be at about the same figure in 1976 with a possibility of a slight increase to 177,000 in 1981. These speculations take account of the projections in Table 13.8 but modify them on the basis of information collected in our formal and informal surveys. In making them it was assumed that existing government regional policies would continue.

ECONOMIC POTENTIAL

42. Tayside's recent economic history has been outlined earlier in this chapter. Employment *fell* by 0.4% a year from 1951 to 1967 whereas employment in Great Britain *increased* by 0.6% a year, the fall in Tayside being almost entirely in male jobs. Moreover, the Region has a record of above-average unemployment, below-average incomes, and appreciable net outward migration.

43. Tayside's share of national employment fell from 8.6 per 1,000 in 1951 to about 7.5 per 1,000 in 1967. This was a consequence of fairly widespread reductions. Employment fell absolutely in 14 of the 24 Industrial Orders and fell relatively in 16 of them. In the manufacturing sector, employment fell in 9 Orders out of 14, and in 3 out of 7 in the services sector. The largest falls occurred in agriculture, textiles, and transport and communications. These, and other reductions, exceeded marked increases in engineering and electrical goods, and in professional and scientific services.

44. A further fall in Tayside's share of national employment is the most likely prediction for 1981. It would be the consequence of stability of employment

TABLE 13.8 **Projections[1] of the Demand for Labour, Tayside, 1967–1981**

(Employees in employment)

	S.I.C. ORDER	*1967*	*1976*			*1981*		
		Actual[2]	*Projection*			*Projection*		
			(1)	(2)	(3)	(1)	(2)	(3)
I.	Agriculture, Forestry and Fishing	12,500	14,000	13,000	12,500	13,000	11,500	11,000
II.	Mining and Quarrying	500	500	500	500	500	500	500
Total.	Primary	13,000	14,500	13,500	13,000	13,500	12,000	11,500
III.	Food, Drink and Tobacco	7,000	6,500	6,500	6,500	6,500	6,500	6,500
IV.	Chemicals and Allied Industries	500	600	500	1,000	500	500	1,000
V.	Metal Manufacture	1,000	1,000	500	500	1,000	500	..
VI.	Engineering and Electrical Goods	17,500	20,000	20,000	23,500	21,500	21,000	26,500
VII.	Shipbuilding and Marine Engineering	1,000	..	1,000	1,000	..	500	1,000
VIII.	Vehicles	500	600	500	500	500	500	500
IX.	Metal Goods N.E.S.	1,000	1,500	2,000	2,500	2,000	2,500	3,000
X.	Textiles	20,500	19,500	24,600	25,000	17,500	24,500	25,500
XI.	Leather, Leather Goods and Fur	..	500)	500	500	..)		
XII.	Clothing and Footwear	1,000	..)			..)	..	..
XIII.	Bricks, Pottery, Glass, Cement	1,000	1,000	1,000	1,000	1,000	1,000	1,000
XIV.	Timber, Furniture etc.	2,000	1,500	1,500	2,000	1,000	1,500	2,000
XV.	Paper, Printing and Publishing	5,000	5,500	5,000	6,500	5,500	6,000	5,500
XVI.	Other Manufacturing Industries	1,000	1,000	500	..	500	..	..
Total	Manufacturing	59,000	59,000	54,000	69,500	57,500	64,000	72,500
XVII.	Construction	15,000	15,000	13,000	13,000	15,500	12,000	12,000
Total:	Construction	15,000	15,000	13,000	13,000	15,500	12,000	12,000
XVIII.	Gas, Electricity and Water	2,500	3,000	3,500	3,000	3,000	4,000	3,500
XIX.	Transport and Communication	8,500	7,500	8,000	7,000	6,500	7,500	6,000
XX.	Distributive Trades	22,500	30,500	26,000	23,500	32,500	26,500	22,500
XXI.	Insurance, Banking and Finance	5,000	4,500)			5,000)		
XXII.	Professional and Scientific Services	24,000	28,000)	51,000	52,000	31,000)	49,500	51,000
XXIII.	Miscellaneous Services	16,000	16,000)			15,500)		
XXIV.	Public Administration and Defence	9,500	8,500)			8,500)		
Total:	Services	88,000	98,000	88,500	85,500	102,000	87,500	83,000
GRAND TOTAL		175,000	186,500	179,000	181,000	188,500	175,500	179,000

1. Projections (1), (2) and (3) are described in paragraphs 35–37 of Chapter 13.

2. The 1967 estimates have been adjusted, on the basis of information from the Department of Employment and Productivity, to include Tayside's share of "unallocated" persons in each industry in Scotland.

overall in the manufacturing and primary sectors, and a small increase overall in the construction and services sectors. Within manufacturing, increases in certain sectors, predominantly in engineering and electrical goods, may be rather more than sufficient to offset reductions in textiles and other industries. Overall the total of jobs may increase, but not as rapidly as in Great Britain.

45. If employment in Tayside behaves as predicted in the 1970s, the jobs available will fall materially below the supplies of employees available from 1981 populations consistent with the upper and lower population growth targets. In particular, there would be substantial shortages of jobs for men. Moreover even if Tayside population fell in accordance with projection EMHF 1, there would barely be sufficient jobs to keep unemployment and net outward migration at recent levels.

46. We think that Tayside employment is unlikely to expand sufficiently in the 1970s to provide an adequate base by 1981 for major growth in the 1980s and 1990s. This forecast may take insufficient account of the possible effects of recent changes in regional policy. On the other hand it is more likely to have underestimated the disturbing effects of the contraction in jute. We conclude that special efforts will be needed to create work of sufficient volume and quality to halt net outward migration in the 1970s and to induce a net flow of people into Tayside and also that some special effort may be needed even in a no-growth situation.

The required expansions in employment

47. The magnitudes of the required expansions in employment in the first phase to 1981 can be outlined by comparing the estimated numbers of employees available (Table 13.7) with the demand estimates in paragraph 41. Comparison shows that the larger scheme of expansion would need an increase in demand of about 25,000 between 1967 and 1981, and that the smaller scheme would require an increase of about 15,000 jobs. The requirement may be met to the extent of about 2,000 jobs if the demand for labour behaves as predicted. The shortage of jobs for men, even allowing for this growth, could be in the range 10,000–15,000.

48. The requirement for the larger scheme of expansion involves a rate of increase in employment of about 1% compound per annum from 1967 to 1981. The requirement for the smaller scheme produces a rate of about 0.7% per annum. These rates are both very different from what Tayside recorded between 1951 and 1967 when there was a *decline* of about 0.4% a year. Moreover these increases would have to be created in a period in which there are likely to be substantial job losses in parts of Tayside's existing manufacturing industry.

49. These requirements are formidable when set against Tayside's recent record. Within the total requirement manufacturing jobs are the critical component and for growth, the need here, in excess of what existing industry may provide, will be at least 5,000 for the smaller expansion and at least 10,000 for the larger expansion. Both of these estimates rely heavily on the ability of existing manufacturing industry to balance, more or less, job losses and job gains over the period: this could be over-optimistic. Comparison may be made with the number of 'mobile jobs' that may be available nationally. If this were 40,000 a year, and if the Development Areas (excluding new towns and similar commitments) are assumed, more or less arbitrarily, to attract 30–40% of these jobs, Tayside's share might be 350–500 jobs a year, on the basis of its share of Development Area population. This would give it a total of 3,500–5,000 additional manufacturing jobs in the period 1971–81. Tayside's possible requirements may also be compared with growth in manufacturing in the new town of Glenrothes located to the south of the Region. Between 1961 and 1967 employment in new manufacturing in Glenrothes has increased from about 600 to about 4,400. Even if the much larger Tayside can achieve this absolute increase by 1981, it will still have some way to go to produce a base from which major growth can take place.

50. For the longer term up to 2001, quantitative description must be put on different bases. First, estimates of the numbers seeking work over time provide a basis for estimates of the required growth of employment. The average annual compound rate of growth between 1967 and 2001 for the larger scheme would be about 1.5%, and the rate for the smaller scheme would be about 1% a year. These are the rates of growth consistent with jobs in Tayside increasing from 175,000 in 1967 to rather less than 300,000 in 2001 on the larger scheme, and to about 250,000 on the smaller scheme. Secondly, we may examine the future distribution of employees among the main categories of employment.

Employment in the long run

51. A major share of future employment requirements would be met by demands for services and construction coming from an expanding Tayside economy. However, primary and manufacturing industry are the heart of the matter even although services and construction may be expected to provide the greater part of new employment Primary and manufacturing industry are the economic base, and must grow adequately.

52. It is a feature of advanced economies (notably the United States) that the share of services employment increases over time. It has been suggested[1] that services employment will probably increase to between 55% and 60% of total employment in the UK by the end of the century. Obviously there will be differences between areas: Edinburgh and London, for example, will be well above the national average.

53. We envisage a figure lower than 55% for the services share of total employment in Tayside even in 2001. Our proposed share of about 52% is supported by the following considerations. On the positive side, we think it important that Tayside should have substantial employment in manufacturing. The greater the size of the industrial complex, within the range relevant to Tayside, the greater the opportunities for external economies of scale, the possibilities for diversification, and the hope of stability of employment. Again, the proportion of services employment seems likely to be higher, the larger the population to be served. For example, the expectation for Humberside is that the proportion would be 55% for the minimum scheme of expansion and 57% for the maximum[2]. Moreover, the Humberside minimum scheme envisaged a population of about 1,300,000 compared with Tayside's maximum of 750,000. On the negative side, we cannot foresee any significant growth of services employment in Tayside catering for national and international markets, even allowing for developments in tourism and recreation. Again, although Tayside has sites that could be developed as research or office centres for establishments that do not require close communication with major centres in, say, Edinburgh and London, we cannot see, in present circumstances, much likelihood of significant and spontaneous developments. We conclude that, at present, an expectation of a services share of 52% of employment in 2001 is reasonable in the light of the foregoing considerations and the projections made in other relevant studies.

54. Employment in construction is certain to increase above the level of 1967 if there is substantial expansion. There was, however, a relatively large labour force in the area in the late 1960s, and we would expect the share of construction employment to move from 8.5% of total employment in 1967 to 9% in 1981 and to 7% in 2001.

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[1] *Humberside, A Feasibility Study*, D.E.A., H.M.S.O., 1969. Pp. 34–35, paragraph 5.5.

[2] *Humberside Report*, Page 36, paragraph 5.15.

55. We expect to see a continuing fall in employment in primary industry. In consequence, its share of employment may be expected to move from 7.5% in 1967 to 5.5% in 1981 and 3% or so in 2001[1].

56. The employment requirements of the schemes of population expansion are summarised in Table 13.9. They show the share of manufacturing employment moving from 34% in 1967 to 34.5% in 1981 and then rising to 37/38% in 2001. This allows the larger scheme a smaller share of manufacturing employment than the smaller scheme in 2001 and a correspondingly larger share of services employment. Given the uncertainties, we think it appropriate to discuss manufacturing employment on the basis of a share of 38%.

Manufacturing employment

57. Successful expansion in Tayside depends on the realisation of a substantial increase in manufacturing employment. Over the period, 1967 to 2001, the number of jobs in manufacturing might be expected to have to increase by 90–100%, from 59,000 to a maximum of 115,000. The requirement for the first phase up to 1981, is estimated as at least 5,000–10,000 additional manufacturing jobs and all, or the major part, of this would appear to have to come from enterprises new to the Region. If the requirements of the first phase were met by about 1981, there would be an expanded manufacturing base to provide some of the new manufacturing jobs required in the 1980s and 1990s. Generally the proportion of jobs to be provided by immigrant firms would shrink after 1981. For these reasons, it is desirable to try to set a clear prescription for the years to 1981: in that period at least 10,000 new manufacturing jobs will be required, over and above what established industry seems likely to provide, to support a population expansion of 56,000 for the Region. The larger part of these jobs might be required in the earlier rather than in the later years of the decade.

58. Any increases in manufacturing employment created by immigrant firms, will have to be gained in a period in which employment in manufacturing nationally is not expected to grow very rapidly. Moreover in the last two decades, Tayside has not experienced a buoyant demand for sites from incoming firms. We conclude that, subject to any new effects that recent changes in development area arrangements may have, the simple continuation of existing policies seems unlikely sufficiently to increase the demand for labour in the Region to support a large-scale expansion of population.

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[1] The working population in agriculture will be larger than these ratios suggest; the projections do not include the self-employed.

TABLE 13.9 Tayside Employment: Actual 1967 and Projections for 1981 and 2001

	Employees in employment (percentages)		
Sector	*1967*	*1981*	*2001*[1]
Primary	7.5	5.5	3.0
Manufacturing	34.0	34.5	37.0 – 38.0
Construction	8.5	9.0	7.0
Services	50.0	51.0	52.0 – 53.0
Total	100	100	100
Employees in employment (thousands)	175	190–200	240–300

1 The smaller scheme of expansion might be expected to have 38% of employment in manufacturing and 52% in services. The larger scheme might produce shares closer to 37% and 53% respectively

2 Unemployment is assumed to be about 2.5% in 1981 and 2001.

14 Industrial Survey

1. This chapter examines the circumstances of manufacturing activity in the Region, considers what advantages and what shortcomings the Region may have as a manufacturing location and reviews the possibilities for future development.

2. Much of the material for the chapter was obtained from a survey of companies manufacturing in Tayside. Formal interviews were held with about 70 firms (representing over one third of Tayside manufacturing employment) and many of these provided statistics of output, employment, markets, sources of supply and transport methods. Informal discussions were held with several other firms including some large textiles firms.

3. Among the findings of these enquiries were:
   - (a) a large proportion of manufacturing capacity in Tayside is owned by enterprises outside the Region — US ownership is particularly prominent;
   - (b) manufacturing industry in Tayside generally enjoys good labour relations;
   - (c) the pleasant environment and Tayside's Development Area status are features widely held to present advantages in manufacturing in the Region;
   - (d) Tayside's remoteness from the major centres of manufacturing is held to be a disadvantage;
   - (e) current shortages of certain types of labour were reported;
   - (f) the main opportunities for growth appear to lie in the metal-using industries and some manufacturers look forward to the development of suppliers and processing industries to support such development;
   - (g) availability of labour is considered to be the most important factor in determining the location of manufacturing plant;
   - (h) Dundee is widely held to be the most suitable location for manufacturing industry within Tayside although Arbroath and Perth were also considered to offer opportunities for manufacturing growth; some respondents considered the smaller towns would provide opportunities for manufacturers as the traditional jute industry declined.

PATTERNS OF DEVELOPMENT

4. Manufacturing capacity in Tayside is owned externally to a high degree. Of the companies in our survey:

   10 were owned by other Tayside companies
   6 were owned by other companies in Scotland (excluding Tayside)
   20 were owned by other companies in England, and
   8 were owned by US corporations.

5. The capacity owned by the US corporations is particularly important in terms of employment. For Scotland as a whole, employment in US-owned companies is of the order of 10% of all manufacturing employment,[1] but the corresponding figure for Tayside is now approaching 25%.

6. The development of US manufacturing activity in Tayside dates from shortly after the second world war. The greater part of this development represents new manufacturing capacity, and mergers with existing companies have been unusual. By contrast, ownership by English companies has come about more frequently through mergers although they too have established new capacity in the Region.

7. Ownership of Tayside companies by other Tayside companies is the result of both diversification and integration. Several companies, particularly those in jute, have sought to reduce their reliance on their existing activities by establishing firms in other fields of manufacturing including engineering. In addition, some enterprises (again, mainly those in jute) have amalgamated with other companies to seek economies by horizontal integration.

8. The geographical distribution of manufacturing in Tayside shows heavy concentration in the Dundee Employment Exchange Area (Table 14.1). A striking feature of manufacturing employment in Dundee has been the development of the City's industrial estates (Table 14.2). Industrial estates have also been established at Perth and Arbroath.

9. Manufacturing in Tayside has traditionally been dominated by textiles. Recent trends, however, suggest that engineering and electrical goods manufacture will soon be the Region's major manufacturing industry in terms of employment (Table 14.3).

10. Employment in manufacturing in Tayside has shown a declining trend in the period 1951–67, though the year-to-year changes have been uneven and increases have been recorded at times. (Table 13.2). Moreover, industrial development certificate approvals suggest that Tayside has fared less well than other Scottish industrial regions in the development of new manufacturing capacity (Table 14.4).

11. We conclude that manufacturing employment, which relies heavily on a declining industry (textiles) and an expanding one (engineering and electrical goods) has shown a declining trend overall in the period 1951–67.

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[1] Survey by Scottish Council for Development and Industry, *Scottish Economic Review*, September, 1969.

TABLE 14.1 Distribution of Manufacturing Industry

Employment Exchange Area	*Percentage of Tayside's manufacturing employment* *1967*
Dundee	68.1
Perth	7.8
Arbroath	6.9
Forfar	4.8
Montrose	2.7
Cupar	3.2
St Andrews	1.9
Brechin	1.8
Blairgowrie	1.8
Anstruther	0.4
Crieff	0.4
Pitlochry	0.2
Total	100.0

Source: Based on Department of Employment and Productivity statistics.

TABLE 14.2 Employment in Factories in the Dundee Industrial Estates

1948	*1952*	*1960*	*1966*
1,075	3,918	7,007	11,407

Source: A.M. Carstairs, 'The Nature and Diversification of Employment in Dundee', *Dundee and District*, ed. S.J. Jones, British Association, 1968

TABLE 14.3 Percentages of Tayside Manufacturing Employment

	1961	*1961*	*1967*
Textiles	44	40	35
Engineering/ Electrical Goods	18	23	30
Food, Drink and Tobacco	12	12	12
Paper, Printing and Publishing	6	8	8
Other	20	17	15
All Manufacturing	100	100	100

Source: Based on Department of Employment and Productivity statistics

Manufacturing is concentrated in the Dundee area where the industrial estates (and adjacent sites) attracted most of the new engineering and electrical goods firms (largely of US ownership) in the late 1940s and early 1950s Although employment in these new firms has been expanding strongly the Region appears to have had only a small share of industrial development cartificates approved for Scotland during the 1960s.

ATTITUDE SURVEY

12. This section is based principally on interviews held with management in the firms in our sample. In the Dundee area, the 32 firms visited employed more than 100; elsewhere in Tayside, 42 firms visited employed 50 or more while two firms employed less than 50.

Tayside's advantages

13. All those interviewed consider that Tayside possesses advantages as an industrial location. A complete list is given in Table 14.7 of the Appendix, but the main advantages referred to were:

(a) Good labour relations
(b) Pleasant environment
(c) Development Area status
(d) Good road communications
(e) Local authority co-operation, and
(f) Links with other Tayside industries.

14. Labour factors were considered to be of primary importance when choosing an industrial site. It was therefore encouraging, from Tayside's point of view, to record that a large majority of managers considered labour relations in the Region to be exceptionally good. One symptom of the good labour relations is the strike experience of the respondent firms. Seventy-one of the firms visited had had no strikes (apart from national stoppages) in the last five years and nearly all of these had never had a strike.

15. All managements interviewed acknowledged certain outstanding environmental qualities which the Region possesses; beautiful countryside and famous golf courses were frequently mentioned. However there were

TABLE 14.4 Distribution of Industrial Development Certificates and Manufacturing Employment in Scotland

Planning Region	*% of Scottish manufacturing employment in 1966*	*I.D.C. approvals 1960–66*			
		Thousand square feet	*%*	*Potential employment*	*%*
Glasgow and W. Central	60	25,348	55	45,400	54
Falkirk/Stirling	8	3,216	7	4,600	6
Edinburgh and E. Central	16	12,355	27	24,700	29
Tayside	8	1,428	3	3,700	4
Borders and S.W.	4	1,138	2	2,700	3
North East	5	1,836	4	1,800	2
Highlands and Islands	1	942	2	1,400	2
	100	46,263	100	84,300	100

Sources Table 18, *Digest of Scottish Statistics*, April 1968
Statistics supplied by Department of Employment and Productivity

comments on how little is known of some of these amenities in other parts of Britain and also about the unfavourable and false impressions, held in some other places, about climatic conditions in Tayside. Perthshire is, of course, developing as an area for winter sports yet Perth itself has lower rainfall and more hours of sunshine than Birmingham or Glasgow. At the other end of the Perth–Dundee–Arbroath strip, Arbroath is one of the sunniest places in Scotland.

16. Development Area status is an advantage that Tayside now shares with almost all the rest of Scotland. The value of the arrangements (investment grants, regional employment premium and, until 1970, selective employment premium varied from firm to firm. The following views emerged. The financial provisions help to offset the disadvantage that a firm may encounter through remoteness from its main markets. Some firms consider the effects to be cost-reducing thereby enabling them to quote lower prices, especially for products in which there is strong competition. Investment grants were considered by some to be especially valuable in allowing them to increase the capital intensity of operations, and attention was drawn to their value in the context of a firm choosing between locations in different countries. It was pointed out that the locational value of investment grants could be dissipated by uncertainty; a firm contemplating an investment programme over, say, five years would be less attracted to a development area if it thought that grants might be reduced or withdrawn within that period.

17. Associated with Development Area status was the availability of good industrial sites. This was regarded as particularly valuable by companies relatively new to the Region; for many companies the main locational requirement (after labour factors) is the availability of suitable factories at reasonable rents. Several of the newer companies expressed satisfaction with the arrangements made with Scottish Industrial Estates.

18. Road communications are considered to be good by most companies interviewed. Developments in the past five years, particularly the completion of the road bridges over the Tay and Forth estuaries, have brought a dramatic improvement. However, in view of the important role which road transport plays in manufacturing activities in Tayside (see Table 23.2) further improvements are considered desirable.

19. Local authorities in Tayside are generally considered helpful and co-operative. Co-operation ranges from assistance in housing key workers to provision of financial assistance for the purchase of land and buildings. Some resentment is felt by a few old-established firms in the Region who consider that excessive zeal is shown in meeting the needs of prospective newcomers while existing firms are relatively neglected.

20. The main manufacturing linkages in the Region are associated with jute manufacture. Supplying industries, *eg* jute machinery, and user industries, *eg* carpets, have developed in Tayside. In addition jute firms have financed companies in other activities, usually engineering - either through acquisitions or new developments. Recently some companies in the jute industry have undertaken developments in synthetics or man-made fibres.

21. Linkages associated with the engineering and electrical goods industries are not yet well developed in the Region. Directions in which it was suggested that linkages with engineering might develop or expand in Tayside include the production of castings, hot die stamping, heat treatment, plating, and automatic turning. It was also observed that a higher level of engineering activity in Tayside should encourage a wider range of stocks to be carried, *eg* steel in a wider range of specifications.

Disadvantages

22. A list of Tayside's disadvantages as a manufacturing location are given in Table 14.8 of the Appendix. The main disadvantages referred to were:

(a) Remoteness
(b) Labour shortages
(c) Communication difficulties.

23. Nearly half the sample consider Tayside to be remote, either from supply sources or from markets or from the point of view of developing personal contacts. Remoteness from centres of concentration of particular industries gives rise to difficulties over the supply of certain specialist services and certain kinds of labour. Apart from these drawbacks, there is a feeling of being 'out on a limb' and away from mainstream developments in the respective industries. Against these points, it is

agreed that the main centres could have considerable disadvantages, eg chronic labour shortage, generally congested locations.

24. Remoteness from markets is considered less important than remoteness from other centres of concentration, though it leads to relatively high transport costs for some companies. Some of the difficulties have been reduced, in a few cases, by siting sales and distribution units in the main market areas.

25. Visits by or to customers are said to be time-consuming. While air transport can usually take visitors as far as Edinburgh, the continuation journey to Tayside imposes a substantial burden on customers' schedules. Similarly, when visiting customers, managers have to reconcile themselves to a whole day away from the office for a meeting which, elsewhere, might have been disposed of in half a day.

26. Labour shortages were reported by over a third of the respondents. These reports came mostly from textiles where shortage of female labour was of particular concern. In other sectors there were no general difficulties and some firms were surprised to learn that there were shortages of female labour in the Region. Increased opportunities for young people, in education as well as new employment opportunities in industry and commerce, are held to contribute to the reported shortages.

27. Shortages of skilled workers were reported in Arbroath and Brechin while the situation in Dundee was said to be becoming difficult. Engineering has been expanding in all of these towns with the largest absolute expansion occurring in Dundee. Other shortages were of operatives with special skills, and managers of particular industrial processes. Some shortages arise because firms are expanding in an area without the traditions of skill or technology required, and personnel have to be attracted from outside Tayside.

28. At least one aspect of communications is considered to be unsatisfactory by about a third of the sample. Air transport attracted most comment. The service provided from Leuchars to London by Autair (which was withdrawn late in 1969) was criticised because of inconvenient times, lack of non-stop services, availability only of tourist class, and relatively long flight times. The use of Turnhouse (Edinburgh) involves a longer road journey and return flights are sometimes diverted to Glasgow. (Air transport is discussed in Chapter 23.) For journeys to and from London many respondents rely on British Rail's sleeper services.

29. Other comments on communications include the unreliability of contractors' road transport for the shipment of small lots. Again, many firms had ceased to use British Rail for freight because of the length of time taken to deliver, but the use of containers in rail services is reported to be giving a highly satisfactory service to large users. So far as sea transport is concerned, manufacturers generally use Leith or Glasgow. It was pointed out that it would be more convenient to use Dundee if suitable sailings were available.

THE REGION'S NEEDS

30. A majority of firms sampled believe average earnings in Tayside to be lower than in most other regions in the UK. Some of these firms consider this advantageous since it makes them better able to compete in price. However most respondents thought that relatively low earnings is a contributory cause of labour's migrating from the Region. Improvement of the earnings situation in Tayside could be brought about by higher levels of output per head and/or by new firms, with higher pay structures, establishing themselves in the area. It is recognised that such new companies would probably make it more difficult for some established firms to get labour.

31. It is thought important that the whole range of employment opportunities in the Region should be widened. The narrowness of current opportunities is considered to make it difficult to attract and retain certain employees. People who wish to follow certain careers may have to leave the area for the necessary training. Even where a chosen employment exists in Tayside the experience available may be restricted so that training in some aspects must be sought elsewhere. Similarly attracting specialist employees may be difficult because of the structure of Tayside manufacturing industry. Where only one or two companies in the Region use a particular manager's or technologist's speciality, such people may be reluctant to come to Tayside because of the lack of suitable alternative employers in the area. The location on Tayside of more companies, including more sizeable companies, would make it more attractive for certain managers and specialists to follow careers within the Region. Employers in textiles consider that more employment for men is particularly desirable in order to improve the availability of women workers.

32. Expansion in engineering and electrical goods has occurred despite the absence of supporting services that would have been available in some other locations. The situation has improved, eg in the stockholding of electrical equipment, ironmongery, but there are areas in which further development is considered desirable (see paragraph 21 above).

33. Manufacturers in Tayside rely heavily on road transport (see Chapter 23) and various road improvements were proposed. Most reference was made to the Dundee to Edinburgh route, in particular the Tay Bridge to Forth Bridge section. The importance of a fast link with the M.6 (and thus with the British motorway system) was also stressed. Arbroath manufacturers strongly supported improvements in the Dundee-Arbroath road while, in the Strathmore towns improvement was advocated for the Perth–Aberdeen route. Respondents generally regarded these improvements as features that would expand industrial activity along the routes involved. (Roads are discussed in Chapter 22.)

34. Attracting workers to the Region depends significantly on the housing situation, and the desirability of having a small pool of modern houses vacant in the Region was mentioned. It is claimed, also, that in Tayside there is room for improvement in the quality and design of much public sector housing, while in the

private sector there is thought to be a shortage of modern houses suitable for middle management.

35. Occasional difficulties are said to be caused by the supply of school places. In Dundee the pressure on places in the High School makes it improbable that admission will be given to the children of all parents new to the Region, who wish to send children to that school. We have been told that men refusing posts in the Dundee area have mentioned this difficulty as a reason for not coming to the Region. Similar difficulties were not reported in other areas of Tayside.

36. A number of other needs, mentioned during the survey, include the improvement of air transport facilities and, by a minority of firms, better provision for musical and theatrical entertainment and for restaurant services. In addition, a few respondents expressed a need for more industrial orientation in higher education in the Region: industrial engineering, computer programming, and management education were specified.

SITING FACTORIES

37. Firms were asked which factors are important when choosing a site for a factory and which areas in Tayside offer the most suitable locations for manufacturing. Their responses are summarised in Tables 14.9 and 14.10 of the Appendix.

38. Access to supplies of labour emerges as the most important locational consideration. Even where this factor was not specified it was implicit, *eg* in the stress laid on the importance of good public transport facilities and proximity to housing. Nearness to workers' homes is, of course, particularly valuable in the employment of married women. On the other hand proximity to town centres is attractive to employees because it allows easy access to shops in the lunch hour or at the end of work.

39. Industrial estate sites are considered attractive by a high proportion of firms as both pleasant places to work in and (given appropriate locations) convenient for workers. The idea of an industrial estate placed at a location more or less equi-distant from three small towns was raised with some respondents but was not regarded with favour. It was claimed that labour would find travelling unattractive and there would be no offsetting features in the form of lunch-hour shopping in a city centre or commercial entertainment to be enjoyed after work.

40. Labour considerations also shape the size of town which manufacturers prefer. Some smaller firms look on small to medium-sized towns with favour as places in which they can make an impact and where young people consider them favourably as potential employers. Another attractive feature of small towns is said to be the high reputation of their labour forces.

41. Other influential factors were transport facilities, a pleasant environment, effluent disposal arrangements, and public utility services.

42. On the subject of locations in Tayside for manufacturing industry, most firms in the sample were generally satisfied that their own areas would be suitable for further development. This attitude affects the results shown in Table 14.10 of the Appendix which tend to reflect the present locations of the firms surveyed. There was, however, recognition, from firms outside Dundee as well as those from within, that the Dundee area offers the most suitable manufacturing location. The following reasons were given:

(a) Its industrial tradition and labour accustomed to working in factories.
(b) Its good road communications, especially since the opening of the Tay Road Bridge.
(c) Its ancillary industrial services.
(d) The size of its population; large firms could not consider any other location in Tayside.
(e) Its industrial estates and the sites suitable for industrial development in close proximity to the City.

Some respondents specified particular parts of the Dundee area as suitable for industrial development. These included:

(a) the area around the existing industrial estates;
(b) the area towards the north of Dundee and adjacent to housing development in the north east of the City: and
(c) the area to the north of Monifieth/Carnoustie, in which direction the City has been expanding.

Concern was expressed over encroachment by manufacturing on attractive countryside. Some respondents suggested that industrial expansion should be concentrated in the Dundee-Arbroath coastal strip.

43. Perth was cited as an attractive town suitable for some manufacturing development. Labour supplies were considered to be easier than in Dundee and its position in the communications network is a special advantage. Arbroath, with its already well-established engineering industry, was judged to offer a suitable location for smaller firms.

44. The need for industry for towns outside Dundee was frequently referred to. All the towns engaged in the jute industry were considered to need new sources of employment. The Strathmore towns were said to be suitable locations for incoming manufacturers with labour becoming available from the contraction of traditional industry.

External ownership

45. The quantity of manufacturing capacity in Tayside that is owned by enterprises based outside the Region has been referred to in paragraphs 4–6 above. Managers were asked to comment on this. The overall impression given was that substantial advantages accrue to the Region and that disadvantages are possible but unlikely to materialise. The benefits mentioned include:

(a) access to technologies and production methods developed by the parent and to specialist services and management techniques;

(b) access to the financial resources of a large group;

(c) the possible specialisation of the Tayside manufacturing unit, by process or by markets, thereby permitting greater efficiency and profitability.

The companies mentioning the possible disadvantages of outside control considered, however, that the advantages were greater on balance. The disadvantages included the possibility of rationalisation within a large group adversely affecting some aspects (or all aspects) of the operations of the Tayside unit.

TAYSIDE'S MANUFACTURING PROSPECTS IN THE SHORT RUN

46. Engineering and electrical goods manufacture is likely, in the course of the 1970s, to replace textiles as the Region's most important manufacturing group. The general attitude of the sample firms within this group was one of confidence in future expansions of output and employment. A number of employment forecasts were obtained, and the general picture suggests an increase in employment that might be as much as 40% in the years from 1967 to 1975 with most of the increase taking place in the earlier years. There is considerable doubt surrounding the magnitude of the increase but less doubt about a slowing down of the rate of growth in the later years.

47. A forecast for textiles is largely a forecast of prospects for the jute industry. The last 12 months (1969/70) has been a difficult period for the industry and it now faces a period of unusual uncertainty. In 1969 the industry's markets in the UK were adversely affected by three factors. The most influential of these was the general reduction in demand attributable to the Government's policy of restraint. Second, there was a much more rapid increase than had been expected in the substitution of man-made materials for jute in various uses. Third, the system of protection enjoyed by the industry was further liberalised in association with the introduction of quotas for regulating imports of the limited range of products that are stil protected. The quotas replaced 'mark-up' arrangements operated by a Board of Trade Jute Control. Among the consequences of these factors were the declaration of a substantial number of redundancies (1,000 or so) and the closure of a number of works.

48. The jute industry has, for many years, been specially protected by Government with the object of maintaining employment in Dundee and Tayside. The progressive reduction of protection in the last decade, and the resultant increases in imports, have reduced the industry's share of the home market but the process was a gradual one. Indeed a recent review of the quota levels to take effect in 1970 has left them unchanged. However further liberalisation of imports may be expected in the years to come.

49. If future employment in jute depended only on the pace of liberalisation, a reasonable expectation would be gradual rundown over the years. However the major threat to the industry's sales and employment now lies in man-made substitutes. In some parts of the industry's markets, man-made substitutes have made substantial progress; and other parts seem likely to be invaded by such substitutes sooner or later. While some jute firms have been developing capacity in the synthetics or man-made fibres fields, and competing successfully, there is already substantial manufacturing capacity outside Tayside, and not in the ownership of traditional jute firms. Consequently it would be surprising if the Tayside industry were able to retain its present shares of all its customary home markets. Moreover, even if it did, the employment offered by a predominantly synthetics or man-made fibres industry would, for given outputs, be much less than the employment associated with similar outputs of jute products.

50. The jute industry in Tayside therefore faces a discontinuity of development at the present time. In these circumstances reasonably accurate forecasting of the course of employment in the 1970s lies in the range from very difficult to impossible. In our view, necessarily a tentative and uncertain one, employment in the industry could be reduced by a third to a half in the next decade or so with, on certain assumptions, the brunt of the contraction likely to fall in the first half of the period. Employment in textiles stood at 20,000 in 1968, 14,000 of this being in jute. Mid-year employment in 1969 was possibly still fairly close to 14,000, the redundancies not having had much effect by that time. This figure, and therefore employment in textiles, will be reduced, and could be substantially reduced in the 1970s.

51. The other main Tayside sectors of manufacturing seem likely to increase their outputs in the 1970s though the course of employment is less certain. Employment in the food, drink and tobacco group has been falling slowly and, with possibilities of greater labour productivity, a continuation of this trend is suggested for the future. In paper, printing and publishing, some respondents foresee a small reduction in the labour force in the short term but employment in the longer run is thought likely to remain around its present level.

Markets and supplies

52. A number of firms provided an analysis of their markets (see also Table 23.1) and this shows heavy reliance on markets outside Scotland. This dependence is expected to increase both absolutely and as a proportion of output. In the sample, markets overseas and in England, Wales and Northern Ireland are expected to absorb 67% of outputs by 1975. Moreover the analysis understates the dependence of Tayside manufacturing on export markets. A quantity of output represents intermediate goods which are exported after further processing outside the Region.

53. A general characteristic of Tayside manufacturing appears to be reliance on external sources of supply for a large proportion of input materials (Table 14.5 of the Appendix). This is a situation that will persist although growth of manufacturing in the Region is thought likely to create opportunities for more suppliers, for the engineering industry particularly, to establish in Tayside. Many materials, *eg* steel, will always be brought into the

Region and the main improvement to which industry could look for such things lies in more extensive stockholding in Tayside.

Transport

54. The importance of external markets and external sources of supply makes transport of particular importance to the Region's manufacturing. The manufacturers sampled rely heavily on road transport, over four fifths of all deliveries leaving their works by road (Table 23.2).

55. The incidence of outward transport costs in firms' total costs is shown in Table 14.6 of the Appendix. Over three quarters of the firms sampled had transport costs of less than 3% of total costs. Within the sample, low proportions of transport costs were notable among firms manufacturing engineering and electrical goods. (We discuss roads in Chapter 22 and transport in Chapter 23.)

Further prospect

56. We have concluded in Chapter 13 that the manufacturing industry already established in the Region is unlikely to generate the increase in employment necessary to halt net emigration and induce immigration at the rates required by the expansion proposals. The attraction of new employers to the Region is thus of great importance for future development. The successful experience of the engineering and electrical goods industries in the Region suggests that this type of manufacturing might respond to the attraction of, and work successfully in, Tayside. Moreover, further expansion of this sector should stimulate the development of supporting processes and services.

Appendix to Chapter 14

STATISTICS FROM INDUSTRIAL SURVEY

TABLE 14.5 Manufacturers' Sources of Supplies, 1967

(numbers of firms)

% of Input drawn from each region / *Region*	Less than 10%	10% – 20%	20% – 30%	30% – 40%	40% – 50%	50% – 60%	60% – 70%	70% – 80%	80% – 90%	90% & Over
Tayside	25	6	2	2	1	1	1	2	–	–
Rest of Scotland	12	7	6	2	2	4	2	1	1	3
England, Wales and N. Ireland	12	2	6	1	3	4	3	2	2	5
Overseas	25	2	2	1	3	1	–	2	2	2

Total number of firms in sample = 40

Source: Industrial Survey

TABLE 14.6 Outward Transport Costs, 1967

Percentage of Total Cost represented by the cost of Delivering Products to Customers %	*Number of Firms*
less than 0.5	4
0.5 –	2
1.0 –	2
1.5 –	4
2.0 –	6
2.5 –	2
3.0 –	1
3.6 –	1
4.0 –	2
4.6 –	1
5.0 –	–
6.0 –	1
7.0 –	1
6.0 –	1
9.0 –	1
10.0 –	1
11.0 –	–
12.0 and over	1
Total number of firms in sample	31

Source: Industrial Survey

TABLE 14.7 Locational Advantages of Tayside
Analysis of views of respondant firms—all industries

FEATURE	*Percentages of FIRMS IDENTIFYING THE FEATURE*
Good labour relations	90
Pleasant environment	86
No strike (in firm) in last 5 years	71
Development Area status	67
Good road communications	46
Good local authority cooperation	45
High quality of local labour	41
Availability of unskilled labour	37
Links with other Tayside firms and industries	27
Low wages	27
Availability of water/soft water	27
Good rail communications	24
Convenient to Scottish/local markets	22
Availability of skilled labour	18
Old-established centre for the industry	18
Convenient for raw material supplies	18
Good education (incl. tech.) facilities	14
Availability of L.A. Housing (through Key Worker Scheme)	14
Low land cost/rent	14
Easy effluent disposal	12
Good port (export/import) facilities	12
Community is the "right" size	10
Tayside is a "growth" area	10
Availability of housing	10
Availability of good industrial sites	8
Short travel to work distances	2
Climate	2
Good relations with local schools	2
Good air communications	2

Source: Industrial Survey

TABLE 14.8 Locational Disadvantages of Tayside
Analysis of views of respondent firms—all industries

FEATURE		*Percentages of FIRMS IDENTIFYING THE FEATURE*
Remoteness	Total (firms)	71
— from markets		20
— supply sources		6
— from technical advice/assistance		6
— generally and other aspects		41
Shortage of labour		59
Poor communications	Total (firms)	49
— air		27
— rail		20
— road		16
— sea		18
Shortage of skilled labour		41
Lack of entertainment, social/cultural facilities		29
Difficult to get executive staff		30
Poor housing		27
Poor education/training facilities		27
Narrow range of industry/lack of services and supplies		18
Poor relations with local authority		15
Image of Dundee/region		14
Poor quality of local labour		10
Poor local public transport		8
High land cost and rates		6
Lack of professional work opportunities		6
High labour cost		6
Vandalism		6
Apprentices/workers leave after training		6
Difficulties over effluent disposal		8
Poor shopping facilities		4
Absence of a middle class		4
Difficult to get graduates		4
Narrow labour market		16

Source: Industrial Survey

TABLE 14.9 Factors influencing Choice of Site

FACTOR	*Firms mentioning the factor*	
	Number	*%*
Proximity to labour	46	84
Industrial estate facilities	20	35
Proximity to transport facilities	19	35
Periphery of community	16	29
Proximity to public transport	15	27
Pleasant surroundings	14	25
Nearness to housing	12	22
Easy effluent disposal	9	16
Water supplies	6	15
Public services available	8	15
Quality of local skills	9	16
Land available for expansion	7	13
Transport costs	6	11
Education and training facilities	6	11
Proximity to town centre	5	9
Rent or land cost levels	5	6
Chance to purchase site	4	7
Car parking space	3	6
Convenient for shopping	2	4
Nearness to existing site	2	4
Clean air	1	2
Proximity to raw material source	1	2
Local authority influence	1	2
Easy access	1	2
Total number of firms specifying factors	55	

Source: Industrial Survey

TABLE 14.10 Tayside Locations suggested as particularly suitable for Manufacturing

LOCATION	*Firms suggesting the location* *Number*	*%*
Dundee	32	58
Perth–Dundee–Arbroath strip	3	5
Monifieth/Carnoustie strip	1	2
Berry	1	2
Perth	10	18
Arbroath	10	18
North Fife	6	11
Teyport/Newport	2	4
Cupar	1	2
Newburgh	1	2
Strathmore towns	5	9
Forfar	5	8
Brechin	3	5
Montrose	3	5
Bleirgowrie	1	2
Crieff	1	2
A New Town	1	2
Total number of firms responding	55	

Source: Industrial Survey

15 The Construction Industry

1. This study analyses the structure and performance of the construction industry in Tayside in the recent past and examines factors influencing the levels of capacity likely to be required in the industry in Tayside given certain rates of growth of its total population.

2. The methods of investigation included analysis of data provided by government departments and trade associations, interviews with firms and organisations in the construction industry, and a postal questionnaire circulated to contractors operating in the region.

Capacity Constraints

3. In recent years the construction industry in Great Britain has been able to expand output and productivity at a rate generally comparable with that of manufacturing industry. Indeed, over a number of periods, the construction industry exceeded the rates of increase of output recorded by manufacturing industry. For the most recent years, the output of the construction industry in Scotland increased more rapidly than that of Great Britain as a whole, and annual rates of increase in output per operative have been high at 4–5%. Certain factors affecting the situation of the industry in Scotland have favoured growth.

(a) The pressure of demand on total labour resources has been relatively low in Scotland. This has helped the industry to retain labour that would otherwise have gone to manufacturing industry.

(b) The Development Area status of almost all of Scotland favours continuity of construction work; continuity is an important factor contributing to higher productivity and, perhaps, to the attraction of capacity in the form of large contractors.

(c) Although the evidence is limited, the contribution of a small number of large-scale contractors to total building output – particularly in housing – seems to be greater in Scotland than in England and Wales. Large contractors, with relatively sophisticated techniques, can achieve higher output levels per operative than medium and small firms.

(d) House-building, of kinds offering scope for high levels of output per operative, has been a major element in Scottish construction output.

4. Analysis of the experience of New Town Development Corporations identified two main factors supporting the view that the construction industry is relatively flexible in capacity.

(a) The mobility of the labour force is illustrated by the success of a number of New Town Development Corporations in attracting construction workers from adjacent conurbations enjoying high levels of construction activity. The favourable experience of Skelmersdale and Telford would appear to be particularly relevant to the situation of Dundee and Tayside in relation to Central Scotland.

(b) Contractors not previously operating in an area designated as a New Town or 'high growth rate region' were attracted by the probability of continuous building programmes. This positive reaction was assisted by the mobility of the industry's labour force. It is also worthy of note that some New Town authorities provided housing for construction industry operatives. This policy was not very important in attracting labour, partly because of the mobility of much of the labour, and partly because of the fact that when resident in a New Town some construction operatives were attracted by manufacturing industry and left the construction industry.

5. In the course of a number of interviews with selected New Town authorities, attention was drawn to certain factors that adversely affected the maintenance of construction resources at satisfactory levels. Fluctuations in the rate at which additional employment opportunities are created directly affect the level of building work. Wide fluctuations result in irregular housing (and other construction) progress and tend to make contractors operate at less than optimum efficiency. Other factors included the risks of relying on a single contractor for a large proportion of a housing programme: and the tendency to find architectural staff difficult to secure, and vacancies difficult to fill when design and development work had reached a relatively mature stage. The New Town Development Corporations were, however, all most emphatic that apart from the effects of national shortages of labour and materials, they had experienced little difficulty in attracting resources to carry out their building programmes.

The Construction Industry in Tayside

6. The salient features of the construction industry in Tayside are summarised below:

(a) Data from the Ministry of Public Building and Works (MPBW) indicate that over a relatively short period to 1967 the numbers of firms and operatives in the construction industry in Tayside have remained relatively constant proportions of the total numbers in the construction industry in Scotland; in contrast, the proportion of the value of new orders obtained by contractors in Tayside increased appreciably towards the end of this period. In 1967, there were about 600 contracting firms with registered offices in Tayside. This may be compared with a figure of around 6,000 for Scotland as a whole. The size of the labour force as defined in the MPBW return from contractors registered in the region, tends to understate the actual number of operatives employed. Using Department of Employment and Productivity (DEP) returns, the labour force in Tayside has been maintained at something of the order of 13,000 to 14,000 in recent years. In 1967, Tayside appeared to become relatively more important, on the basis of new orders, as an area of construction activity within Scotland. Contractors' new orders, as recorded by the MPBW, rose from about £20m in 1965 and 1966 to just below £40m in 1967. In 1967 new orders for Tayside accounted for just below 10% of the total obtained by contractors in Scotland as a whole, the percentages for 1965 and 1966 being just under 6% and just under 7% respectively.

(b) Medium to large construction firms are relatively strongly represented in Tayside as resident contractors. Firms of this size (*ie* employing more than 300 operatives) account for about 4% of the total number of construction firms employing more than 13 operatives in both Scotland and Great Britain. In Tayside this size of firm accounts for about 10% of the total. Furthermore, for a number of years, several national firms have undertaken work in the region at a relatively low level of activity, *ie*, less than £500,000 per annum. There are two building firms of national (Scottish) standing registered in Dundee and a number of major contractors of national (Great Britain) standing operate on a relatively continuous basis in the region. Moreover the Building Department of the Corporation of Dundee employs some 600 operatives. Civil engineering firms are, by the nature of their work, relatively mobile and cannot be classified in the same way as building firms in the regional structure of the industry. However, a number of such firms have been prominent in the region in the recent past.

(c) The distribution of the labour force and building and specialist sub-contractors matches the existing distribution of population. Four towns in the region account for about 70% of housing activity and more than 80% of the construction industry labour force is registered at the DEP Exchanges in these towns..

(d) Factory capacity for the production of system building components in the region is limited to one major unit in Dundee, operated by Crudens Ltd. The current capacity of the factory is put at 750 houses per annum, and it is planned to increase it to 1,000 per annum. There are also a number of small units in relatively early stages of development. More significantly, heavy concrete components have been successfully transported from Falkirk for the construction of high-rise flats in Dundee.

Future Capacity

7. The recent performance of the Scottish construction industry, the experience of the New Town Development Corporations and recent developments in Tayside, suggest that the likely rates of growth of population would not be constrained by the inability of the construction industry to expand at the required rates. To test this hypothesis postal questionnaires were distributed to a number of building and civil engineering firms operating within the region. Certain factors that could act as constraints were revealed, but it appears that annual increases of output of at least 10% could be achieved without undue difficulty.

8. In general, analysis of the data collected suggested that the capacity of the construction industry in Tayside could expand, relatively easily, to meet any future demands likely to be placed upon it. Respondents considered that the most significant requirements within this optimistic view were

(a) continuity of work;

(b) a wider use of serialised and negotiated contracts, particularly as increased capital funds were likely to be tied up in projects;

(c) availability of skilled labour, particularly if increases in annual output in excess of 10% per annum had to be achieved; and

(d) availability of working capital, particularly for the small to medium firms whose areas of activity coincide with the Tayside region.

9. Some of these factors were examined in more detail with the assistance of various building and civil engineering firms operating within or on the periphery of the region. These firms emphasised the importance of the mobility of labour employed in the construction industry. It was suggested that building trade labour was mobile within a radius of at least 30–40 miles. Willingness to move to where work is available is supported by the standard allowances available for travelling time and subsistence. Contractors had different ideas about the possible sources of additional labour for Tayside, but it is clear that large supplies of labour exist within a 40-mile radius of the perimeter of the Tayside region. On the demand side, labour requirements for hypothetical increases in the Tayside construction programme are difficult to quantify in the absence of certainty about types of construction and the output-mixes at different times. However, an increase of 1,500 dwellings per annum in the current housing programme would require an additional 1,000 to 1,500 operatives. Such an increase represents less than 5% of the labour force currently employed in the three regions adjacent to Tayside (North East Scotland, Falkirk/Stirling, Edinburgh). In so far as labour does have to travel into the area, either on a daily or weekly basis, clients for construction projects would have to meet extra costs which might be of the order of an additional 5–10%. It should, however, be remembered that the willingness of labour to move into Tayside is also affected by the volume of construction activity elsewhere in Scotland.

10. In contrast to the generally optimistic view about labour supply, attention was drawn to three possible causes of difficulty:

(a) Exceptional increases in the load on the construction industry in particular areas in the region could, in the short run, unduly increase the costs of construction. Dundee, for example, was described as an area of high bonuses, but trades union representatives explained that these were due to productivity agreements negotiated with employers. In so far as higher payments to labour are offset by higher productivity, no comment is necessary.

(b) The distance of Dundee from the high construction activity areas of the Central Belt has resulted, we believe, in a relatively small proportion of specialist sub-contracting firms in the region. Moreover, personnel employed by such firms appear to be less mobile than workers in such traditional building crafts as bricklaying, joinery, and plastering. Unless the initial build-up of the parts of the construction programme employing relatively high proportions of the skills required by specialist sub-contractors - for example, hospital, university, and commercial complexes - was implemented at a rate that allowed for steady increases in the supply of these skills, shortfalls could arise.

(c) The balance of project designs has an important influence on the demand for particular labour skills. It was reported that the demand for *in situ* concrete structures in the region was causing a shortage of shuttering joiners, at the time of the survey, compared with a ready availability of bricklayers. This sort of situation is difficult to control - especially for private sector projects - but a development corporation or similar controlling body can act as a useful co-ordinator in such matters. For example, such a body could attempt to balance a house-building programme between traditional, rationalised traditional, and system methods of construction.

11. Respondents emphasised the importance of the size and type of building contracts which were likely to emerge in an expanding region. For housing contracts, respondents were of the firm opinion that the optimum contract size was for 200 houses extending over a contract period of two years. The advantages of larger contracts were not considered to be particularly significant from the point of view of the organisation of labour and the attainment of higher productivity levels. Non-housing contracts tend to occur more spasmodically and it is therefore important that a firm base-load in the non-housing sector should be established. A further important feature in non-housing sectors is the contract size; major national contractors require turnover levels of between £2m and £3m per annum before establishing branch or regional services and the possibility of achieving these levels would be required to foster the entry of such contractors into Tayside.

12. System building capacity located in Tayside for the production of housing components is equivalent to about one-third of the present housing programme; moreover, supplies of components have been drawn from the Central Belt. We consider that an increase in the housing programme - even by as much as 2,500 houses per annum - would not justify, for the following reasons, the establishment of further substantial capacity of this nature in Tayside.

(a) Considerable excess capacity for the production of system-building components already exists in Scotland. Many firms are operating on low margins, and in some cases substantial losses have been made.

(b) The main Scottish factories producing system-building components, excluding those in Tayside, are located in the Central Belt and NE Scotland. Components from these factories can be hauled, economically, at least to the perimeter of the Tayside region.

(c) Although only one major factory for the production of system-building components has been established in Tayside, other factories capable of small expansions are located in Dundee and Perth.

13. Contractors suggested that the designation of Tayside as a growth area would inevitably attract a large influx of design, engineering and surveying staff. Although such an influx would undoubtedly be advantageous (and necessary) in many respects, contractors maintained that the multiplicity of design solutions would be likely to increase by a large margin. If this were so, it could cause imbalance in labour flows and undesirably low standardisation in building components with the consequence that building costs would be higher than they need have been.

14. It was observed by respondents that the multiplicity of clients likely to be involved in the execution of a comprehensive programme for a particular area would make the co-ordination of planning, *etc* difficult, and that this could prevent the emergence of the optimum flow of projects from the point of view of contractors. The reorganisation of local government may, however, facilitate co-ordination (particularly of the timing of building starts) between authorities of differing sizes and responsibilities.

CONCLUSIONS AND RECOMMENDATIONS

15. The evidence of this study indicates that it is highly probable that the capacity of the construction industry in Tayside will not act as a constraint on the rates of expansion in population and employment which may be proposed for the region in other parts of the planning study. The main points which lead to this view are summarised below.

(a) The recent performance of the Scottish construction industry.

(b) The fact that New Town Development Corporations have found contractors willing to mobilise resources to undertake substantial programmes in areas previously operating at low levels of activity.

(c) The structure of the Tayside construction industry, and recent changes in this structure, are consistent with trends for the whole Scottish industry. Such differences as are discernible demonstrate a basic strength in the

Tayside industry, particularly in the representation of medium to large firms working in the area on a fairly continuous basis.

(d) In the view of contractors, the outstanding factor which would contribute to the industry's ability to increase capacity in Tayside would be some assurance of continuity of work. This is, of course, a general plea made by the construction industry in other regions and sectors. Reduction of uncertainty about the future load of work is important, and publication of a substantial amount of information about the future basic construction programme in the area would contribute significantly to the ease with which the industry could increase its capacity at any required rate.

(e) Respondents emphasised the importance, in comparison with other factors, of the need for adequate supplies of skilled labour. This became more important the higher the increases in annual output that were proposed.

16. All things considered, and making allowances for the factors that could act as constraints, it appears that annual increases of at least 10% in output could be achieved without undue difficulty.

Recommendations

17. The policy of physical expansion for the Tayside region, and the demands placed upon the construction industry, should consider the following:

(a) The possibility of rolling building and civil engineering programmes, projected forward for some years, that indicate the probable levels of expenditure for major sectors. Such programmes could be divided into two categories: first, the more definite schemes and, second, possible additional elements. It would be expected that the former category would represent a larger proportion of the total forecast for the earlier years. With such information, contractors could identify markets for optimum expansion and deploy resources accordingly.

(b) Policies of selective, serial, and negotiated tendering would be of importance in ensuring that contractors investing resources in the region were provided with some guarantee of continuity of work.

(c) It is not recommended that additional industrialised building capacity should be established in the region to support a policy of population expansion. Current capacity is not insignificant and advantage can be taken of unused capacity already in other parts of Scotland.

(d) The possibility of finding some means of limiting the growth in the number of design solutions that might emerge in the region is worthy of consideration. This would be important in the early part of the building programme when new resources are entering the region. The common plan ranges which are being introduced by the Scottish Local Authority Special Housing (SLASH) are an indication of what may be required.

16 The Shopping Hierarchy

1. Shopping facilities are important to the development of a city region that would attract people and industry to Tayside. Providing new shopping capacity to serve a substantially increased population would add to what is already a major source of employment, would require material quantities of capital, and would generate significant demands on the construction industry. The study of shopping centres and their interrelationships has been an important consideration in our examination of possible distributions of population within Tayside. Moreover preparation of proposals for shopping facilities has assisted the development of complementary policies towards the competing claims on land from other elements of the urban system such as entertainment, wholesaling, storage, and offices.

2. A model hierarchy of shopping facilities (paragraphs 33 to 40) was used as a guide to the increments of population that might be added to existing communities and to the sizes and locations of possible new communities. The sizes and natures of these centres were suggested after considering possible changes in consumer behaviour and the retail structure. It was appreciated that, for the individual, the journey to shop is probably next in importance after the journey to work.

3. The defects of the model, and its weakness in application, were fully recognised. Projections in retailing are subject to wide margins of error. The critical demand variables include size of population, level of income, social status, and car ownership; on the supply side, there are costs, techniques, and market structures. All of these are notoriously difficult to project even over short periods. Moreover, in the establishment of shopping centres, private capital is often the deciding factor. It follows that the model and the associated analysis provide a framework for decision-making, and do not set out a rigid plan for a situation in which a flexible approach is required.

4. While this chapter provides a policy framework within which detailed decisions can be made at a local level about the location and areas of floor space required for retailing, we must emphasise that other services, including wholesaling, are also substantial consumers of space in urban areas. We comment briefly on these other requirements in paragraphs 48 to 57.

5. The Tayside hierarchy of shopping centres and their functional linkages are considered as follows:—

(a) What is the present situation?

(b) How is the hierarchy likely to be affected by future trends in the economic, social and cultural habits of consumers and in the market structure and methods of the retail trade?

(c) How might the hierarchy be effected by, and in its turn affect, different sizes and distributions of population?

(d) How can future effective demand be estimated and translated into floor space requirements?

6. Retailers, as the penultimate stage between producer and consumer, typically locate as close to their customers as is compatible with the attainment of a large market area. The market area of a shop is that surrounding region from which, with varying degrees of probability, customers may be expected to travel to that shop rather than to another competing shop. Market areas differ for convenience and durable goods. Convenience goods are bought frequently and regularly, and have low unit costs; consumers tend to travel only short distances to obtain them, *eg* groceries, tobacco. Durable goods are bought less often and intermittently, and have higher unit costs, and consumers are prepared to travel longer distances to compare and buy them, *eg* cars, washing machines. A shop selling durable goods usually requires, for viability, a larger market area than a shop selling convenience goods.

The Present Situation

7. Tayside is not a closed system for retailing. There are leakages to centres outside the Region (*eg* Kirkcaldy, Glenrothes, Edinburgh, Aberdeen). Conversely, considerable support is generated from outside for shops within the Region (*eg* Perth, Pitlochry, St Andrews, East Neuk). Table 16. 1 shows that expenditure per head at £162.6 a year, was £6.2 per annum less than the Scottish average in 1961.

8. Retailing provides jobs for about 1 in 10 persons employed in Tayside (Table 16.2). In the period 1951–1961 employment in retailing rose from about 15,000 to about 19,000 increasing from 8.2% to 10.7% of total employment. In the subsequent period, 1962–1966, employment fluctuated, but by 1966 the situation was similar to that of 1961. In the long term employment in the retail trade may be expected to rise both absolutely and as a proportion of total employment. In the short term however various factors, *eg* government measures, will modify and may even reverse that trend.

TABLE 16.1 Shopping Turnover in Tayside compared with Scotland and UK, 1961

	Population 1961	*Turnover £000*	*Turnover £ per head*	*Number of establishments*
Tayside	451,962	73,327	162.6	4,792
Scotland	5,178,490	870,187	168.8	53,386
U.K.	51,250,490	8,918,860	174.9	597,307

Source: Census of Distribution, 1961

TABLE 16.1(a) Shopping in Tayside, 1961

LOCAL AUTHORITY AREA	*Estimated Population 1961*	*Turnover £000*	*Turnover £ per head*	*Estimated gain or loss from outside £000*	*Number of Establishments*
ANGUS COUNTY	278,370	46,180	165.9	+ 917	2,888
Burghs					
ARBROATH	19,533	3,752	192.1	+ 576	314
BRECHIN	7,114	1,565	220.0	+ 408	146
CARNOUSTIE	6,511	879	159.5	− 17	85
DUNDEE	182,959	33,069	180.9	+3340	1,715
FORFAR	10,252	2,202	214.8	+ 535	192
KIRRIEMUIR	3,485	763	218.9	+ 196	76
MONIFIETH	3,475	351	101.0	− 214	33
MONTROSE	10,702	2,608	243.7	+ 868	188
Districts of County					
BRECHIN	4,921	158	32.1	− 642	26
CARNOUSTIE	5,517	68	12.3	− 829	14
FORFAR	7,078	385	54.4	− 766	45
KIRRIEMUIR	4,515	92	20.4	− 842	17
MONIFIETH	7,702	212	27.5	−1040	29
MONTROSE	5,606	56	10.0	− 856	9
PERTH COUNTY (Part)	112,617	19,080	169.4	+ 768	1,168
Burghs					
ABERFELDY	1,469	515	350.6	+ 276	39
ABERNETHY	601	99	164.7	+ 1	9
ALYTH	1,862	819	332.4	+ 316	40
AUCHTERARDER	2,426	477	198.6	+ 83	43
BLAIRGOWRIE	5,168	1,385	268.0	+ 545	88
COUPAR ANGUS	2,049	431	210.3	+ 98	38
CRIEFF	5,773	1,408	243.9	+ 469	106
PERTH	41,199	11,128	270.1	+4429	479
PITLOCHRY	2,501	617	246.7	+ 210	41
Districts of County					
CENTRAL	9,147	556	60.8	− 931	68
EASTERN	9,171	286	31.2	−1205	46
HIGHLAND	8,598	536	62.4	− 862	55
PERTH	22,655	1,023	46.2	−2661	114
FIFE COUNTY (Part)	60,975	8,067	132.6	−1680	738
Burghs					
AUCHTERMUCHTY	1,354	224	155.4	+ 4	24
CRAIL	1,066	163	152.9	− 10	23
CUPAR	5,495	1,877	341.6	+ 984	100
ELIE/EARLSFERRY	1,128	187	165.8	+ 4	31
FALKLAND	1,032	−	−	−	−
KILRENNY/ANSTRUTHER	2,888	567	196.3	+ 97	61
LADYBANK	1,207	107	88.6	− 89	18
NEWBURGH	2,079	265	127.5	− 73	28
NEWPORT	3,326	318	95.6	− 223	39
PITTENWEEM	1,576	261	165.6	+ 6	25
ST ANDREWS	9,888	2,349	237.6	+ 741	150
ST MONANCE	1,406	148	105.3	− 81	25
TAYPORT	3,151	384	121.9	− 128	43
Districts of County					
CUPAR	13,868	666	48.7	−1556	86
ST ANDREWS	11,711	551	47.0	−1353	85
TOTALS	451,962	73,327	162.6	−	4,792

9. Tayside has two primary shopping hinterlands: Dundee is the more important centre, but Perth provides an almost equally attractive regional centre.[1] For most aspects of regional shopping the centres are competitive, ease of access determining the centre favoured by the customer. In other aspects they are complementary: Dundee has the larger number and variety of shops providing specialised goods and services; Perth projects the image of more leisurely personal service with a range of quality shops. In addition, the region has a number of smaller centres providing full ranges of convenience goods and a range of durables (Table 16.3).

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[1] The following paragraphs owe much to the work of Mr Derek Diamond. We refer in particular to the *Grangemouth/Falkirk Regional Survey and Plan*, HMSO, Edinburgh, 1968.

TABLE 16.2 Employment in Retailing, Tayside, 1951–66

	Number	*% of Tayside total employment*
1951	14,868	8.2
1956	15,354	8.5
1961	18,906	10.7
1962	20,171	11.0
1963	18,465	10.0
1964	19,597	10.7
1965	19,498	10.7
1968	18,915	10.5

Source Department of Employment and Productivity

TABLE 16.3 Retail Turnover and Floor Space in Selected Tayside Burghs

	1966 Retail floor space	*1961 Retail turnover*
	sq ft	*£000*
Aberfeldy	42,000	515
Arbroath	305,000	3,752
Auchterarder	31,000	477
Blairgowrie	112,000	1,385
Brechin	140,000	1,565
Carnoustie	60,000	879
Coupar Angus	33,000	431
Crieff	107,000	1,408
Cupar	111,000	1,877
Dundee	2,000,000	33,089
Forfar	193,000	2,202
Kirriemuir	49,000	763
Monifieth	23,000	351
Montrose	221,000	2,608
Perth	680,000	11,128
Pitlochry	50,000	617
St Andrews	200,000	2,349

Note Certain other burghs had larger turnovers than some of those included above Alyth (£619,000), Kilrenny and Anstruther (£567,000), and Tayport (£384,000).

Sources Assessors' Records of Perth, Angus and Fife Counties and Dundee City; 1961 Census of Distribution.

10. Dundee has the greatest number and variety of shops and absorbs 45% of the retail turnover of the region. As a shopping centre, Dundee has a number of constituent segments of which the most important is the Central Shopping Area (CSA) which accounts for about 50% of the City's retail turnover; of this approximately 80% is sales of durable goods and 20% sales of convenience goods. Redevelopment of the Overgate has increased the attractiveness and turnover capacity of the Area. About 75% of the customers of the CSA originate from within 2½ miles of it and over 90% from within 15 miles. The CSA of Dundee has a relatively restricted hinterland conditioned in part by the physical barriers of the Sidlaws to the north, the Tay to the south, and the existence of a thriving regional centre to the west. About 50% of the customers travel to the CSA by bus while the remainder divide evenly between walking and driving.[1]

11. A number of subordinate centres lie within the immediate hinterland of Dundee. Shoppers from these centres meet their convenience needs locally but tend to travel to Dundee for durables. Wormit, Newport and Tayport, on the south bank of the Tay, depend upon Dundee for durables. On the north bank, Invergowrie to the west and Monifieth and Carnoustie to the east, show a similar dependence.

12. Perth is an attractive regional centre serving a large agricultural hinterland and benefiting from a considerable tourist trade. About 15% of the Tayside retail turnover falls to Perth with its Central Shopping Area dominating the trade. Among the factors that explain the success of Perth as a thriving regional centre only 22 miles from Dundee are its historical importance and strategic location, a prosperous 'close support' and hinterland, and the fact that a large part of its quality trade is complementary to, rather than competitive with Dundee.[2]

13. Abernethy and Newburgh to the south of Perth have close links with that city. Auchterarder lies almost equidistant between Stirling and Perth but shoppers tend to regard Perth as the more attractive centre.

14. Shoppers from Alyth, Blairgowrie and Coupar Angus use both Perth and Dundee. Shoppers from the

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[1] Data on customers from a survey conducted by Dundee College of Technology in 1967.

[2] A detailed commercial assessment has been made in the Scottish Development Department's Perth Case Study.

remainder of the Strathmore towns are clearly within the sphere of influence of Dundee. Forfar, Brechin and Blairgowrie are good examples of district centres to which the population of the surrounding rural areas make weekly or twice-weekly visits for shopping. Kirriemuir, Coupar Angus and Alyth cater in large measure for the needs of the dispersed populations of the adjacent rural areas.

15. Montrose is a thriving district centre looking mainly to Dundee, though also to Aberdeen, for regional needs. It benefits by its location almost equidistant between these centres and from a considerable tourist trade. Brechin, only six miles to the west of Montrose, is definitely within Dundee's sphere of influence.[1]

16. Arbroath provides a full range of convenience goods and a wide range of durables but it suffers serious traffic congestion in its Central Shopping Area.

17. Crieff, Aberfeldy, and Pitlochry all look to Perth as their regional centre. They provide a greater range of shopping facilities than their immediate 'close support' would justify. This is because they service large hinterlands in the adjacent Highland area and benefit from considerable tourist trade.

18. Before the opening of the Tay Road Bridge (1966) the north of Fife was linked to Dundee only by rail and ferry. This encouraged the growth of St Andrews and Cupar as district shopping centres, which are in part competitive, in part complementary. Retailing comes after the university as the most important sector of the St Andrews economy from the employment point of view.[2] Support from the permanent population of the town and its immediate hinterland is supplemented by the requirements of more than 2,000 students in term and large numbers of holidaymakers in summer. In consequence, more specialist and quality shops exist in St Andrews than might be expected in a town of its size. The strategic location of Cupar at the centre of a large agricultural area has ensured its position as a thriving district centre. This situation may change as a consequence of the existence of the road bridge and growth of population and shopping facilities at St Andrews and Glenrothes.

19. Like Strathmore, the north of Fife has a number of lower order centres serving a dispersed, largely rural population. Of these Auchtermuchty, Falkland and Ladybank are the most significant.

20. The towns of the East Neuk of Fife, Crail, Anstruther, Pittenweem, St Monance and Elie, each serve their immediate close support and large numbers of summer visitors with convenience goods. Of the group, Anstruther has the greatest number and variety of shops. A considerable proportion of the East Neuk's expenditure on durables goes to Kirkcaldy, Leven, Methil and Buckhaven.

21. Tayside has in total about 5 million square feet of gross floor space devoted to retailing, and an average turnover per square foot of about £15. There is evidence of low turnover per square foot throughout the area and thus the possibility of more efficient use of floor space.

Future Trends

22. Within the next 30 years radical alterations may be expected in the market structure, conduct, and performance of retailing as it responds to changes in consumer behaviour and demand. In practice, of course, retailers will operate within various social and economic constraints and there will be a lagged and imperfect response to changes on the demand side.

23. Retail sales will increase as real *per capita* incomes increase but less quickly since much of the increases in incomes will be spent on transport, holidays, housing, entertainment, etc. Increasing real retail expenditure will not require a corresponding increase in retail floor space. First, part of the increased expenditure will be on quality rather than quantity and on items which are pre-packed, refrigerated, processed or otherwise have a high value-added content.[3] Second, increases in productivity will enable the same amount of floor space to handle higher turnover.

24. One measure of productivity in retailing is turnover per square foot. Widely different estimates of present turnover per square foot have been offered, suggesting varying trading conditions and levels of productivity throughout the industry. There are particularly wide variations between productivity in older shops and in more modern, and better laid out, property. Thus increases in productivity will follow the replacement of older property by new outlets as part of redevelopment schemes, and shops in entirely new developments will also have higher rates of turnover per square foot. A steady increase in productivity is to be expected in the future as a result of the more efficient use of factor inputs, especially labour.[4] Increases will be more readily achieved in selling regularly-bought (and hence more predictable) convenience goods than in the case of space-expensive durable goods even though sales of the latter will expand more rapidly.

25. If present trends continue consumers will place increasing emphasis on ease of access to shopping facilities, competitive pricing, availability of credit, and the attractiveness of store layouts. The shopping trip will remain multi-purpose but its social aspects (meeting friends, exchanging gossip) will become less important. Perhaps the most significant changes in consumer

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[1] Based on a survey conducted by Angus County Council Planning Department.

[2] A most interesting and relevant discussion of the economy of St Andrews is to be found in C Blake and S McDowell, 'A local input-output table', *Scottish Journal of Political Economy*, Vol. XIV, 1967, pp. 227–242.

[3] This, and other trends mentioned, are suggested by American experience. If it is accepted that British experience often differs in timing and degree rather than in kind from North American then valuable lessons may be drawn. It is wrong, of course, to expect North American experience merely to be duplicated in Britain. Account must be taken of differences in institutions and national ethos.

[4] K D George and P V Hills, *Productivity and Capital Expenditure in Retailing*, Department of Applied Economics Occasional Paper No. 16, Cambridge University Press, 1968.

behaviour will spring from increasing use of the motor car which will radically alter the relative accessibility of shopping centres. In general, large centres offering a wider variety of goods will benefit from motorised shopping at the expanse of small ones. However congestion and lack of parking space in large centres may limit their development to the advantage of small centres located peripheral to the core. Centres that can accommodate cars will have a competitive edge over those that find it difficult to offer such accommodation. Weekly or bi-weekly one-stop shopping will increasingly become the norm of a predominantly car-owning society, with visits to local shops to make good small requirements in convenience goods and irregular trips to regional centres for specialised requirements or to compare durables.

26. Outstanding features of British retailing in the 20th century have been the increase of average shop size and the extension of ownership over a number of outlets. The term 'economies of scale' covers a variety of factors that combine to favour large units and large organisations.

27. Mass production of quality-controlled retail goods, which is a pre-condition for the development of uniform branding, packaging and advertisement of products, seems likely to become more widespread. This will make possible further standardisation of retail outlets with built-in guarantees of quantity and quality continuing to change the skills required by individual retailers from those concerned with buying and merchandising to the techniques of accounting and market analysis. Moreover consumer behaviour seems likely to become more homogeneous under the influence of the mass media and mass education. And increasing standardisation of product, outlet and demand, will enable retailers to take further advantage of the economies of large scale operation. To these trends will be added the possibilities of computerised data handling and the mechanised movement of merchandise. The economies of scale inherent in these operations will strengthen the trend towards a smaller number of organisations and outlets. The abolition of resale price maintenance, the increase in self-service, and the increased use of advertising, trading stamps, free gifts and other powers of persuasion also favour larger organisations and outlets.

28. There may be further breaches in the traditional barriers between outlets, merchandise being sold through outlets differentiated by function rather than by product, *eg* supermarkets, variety stores. In the future, as in the United States and Canada, conglomerate retailing institutions may evolve as techniques become increasingly standardised and firms integrate horizontally and vertically to spread their risks and to seek higher profits.

29. While new forms of retailing organisation will emerge, existing forms will flourish so long as they are able to adapt to consumer requirements. Novel and hybrid forms of outlet are tending to proliferate, *eg* supermarkets, discount houses, while old forms such as the market have rarely disappeared completely. But supermarkets, multiples, and variety stores will benefit particularly from the trends outlined above. [1]

30. Though mass merchandising by horizontally integrated retailers may dominate, it will never monopolise. Retail outlets geared to mass merchandising are not able to meet the requirements of minority groups. Moreover, in an increasingly affluent society individuals will be better able to develop exotic tastes and demand products of exceptional quality. These will, in general, be supplied by small specialists who will remain independent of and complementary to the large horizontally-integrated retailers.

31. Examination of these trends suggests that retailing will be consolidated into a smaller number of outlets with larger floor space per unit and greatly increased turnover per square foot. Supermarkets, multiples and variety stores seem to have a particularly bright future. New and prime sites with correspondingly high rents will tend to be taken by large operators with ready access to capital. Specialist retailers will tend to locate in older properties though in some cases they may become valuable tenants in modern centres seeking to provide for a discriminating public.

32. The 1961 Census of Distribution suggested that retailing in Scotland was not changing as rapidly as in the country as a whole and, particularly, more slowly than in the south east of England which appeared to be the centre of retailing innovation. There is reason to suppose that recent changes in Scottish retailing are bringing it into line with the rest of the country.[2]

A MODEL HIERARCHY OF SHOPPING FACILITIES

33. The changes in consumer behaviour and in the structure of the retailing industry discussed in the previous section suggest the development of an ideal or model hierarchy of shopping facilities. The bases for such a hierarchy are —

- i. the nature of consumer demand on the shopping trip;
- ii. the frequency of the shopping trip;
- iii. the predominant form of transport used;
- iv. the site preferences of various types of retailers; and
- v. the market area required to sustain these retailers.

Four levels of shopping facilities may be distinguished in the model hierarchy: local, district, regional, and supra-regional.

34. A *local centre* will be visited several times a week generally on foot either on a casual basis to pick up items forgotten on the main shopping trip or, more regularly, for perishable goods, *eg* milk, bread, newspapers. Shops will carry a range of convenience goods. Expenditure per visit will be small as will the gross floor space of shops and the capital required to set them up. Shops in local centres provide opportunities for independent shopkeepers prepared to work long and/or odd hours.

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[1] A fuller review of trends is to be found in C Fulop, *Competition for Consumers*, Allen and Unwin, 1964.

[2] See for instance G D Credland, B E Luby, G T Murray and I Le Frenais, *Scotland, the Vital Market*, London, Nelson, 1966, pp. 123–4.

35. The higher the proportion of car owners in the population and the greater the relative accessibility to the district centre, the next level of the shopping hierarchy, the smaller the local centre will be. At the lowest, it may be an isolated corner store selling groceries or a free-standing supermarket. In areas of low car ownership, or where movement by car is severely restricted, a cluster of shops might develop composed of, say, a supermarket, a post sub-office, a chemist, a newsagent/tobacconist/confectioner, and a hairdresser. Such a cluster would require a market area population of around 5,000, but a local centre need not be as large as this.

36. A *district centre* is likely to be the most rapidly expanding level of the model hierarchy. It will be geared to once-weekly or twice-weekly one-stop bulk shopping by car and will require appropriate car-parking facilities. The centre will carry a full range of accessibility and a limited range of attraction goods.[1] District centres will be particularly suitable locations for multiples geared to regular standardised patterns of demand. Small district centres will have at their hearts the supermarkets and other foodshops *eg* dairies, butchers, greengrocers, bakeries. Larger centres will also include a range of drapers, chemists, ironmongers, shoeshops, shops selling radio and electrical goods and, perhaps, a small variety store. District centres serving populations that include a high proportion of particular socio-economic groups may support some specialist shops, *eg* quality shops such as boutiques. The smallest district centre would require a population of about 15,000 in its market area and a large centre a population of 60,000 or more.

37. A *regional centre* will be visited less frequently than a district centre, say once or twice monthly. It will carry full ranges of accessibility and attraction goods. A regional centre will, ideally, be located within a large market area for durables and specialist goods which are bought intermittently and by comparison. In addition to a wide range of the more expensive household goods, there will be specialist clothing and footwear shops, quality jewellers, variety stores, and a number of shops geared to specialised food requirements, sports goods, etc. A regional shopping centre would generally require a market area with a population of at least 100,000. Shoppers will come to a regional centre by car or public transport.

38. A *supra-regional centre* is distinguished from a regional centre by its greater number and size of competing retail outlets and the range and quality of the goods and services which they provide rather than by different types of outlet. It will offer within its function as a supra-regional centre a limited range of accessibility goods and an excellent range of attraction goods. It may be visited only two or three times a year, say for Christmas shopping, sales, etc. Congestion and parking problems in the central shopping area will almost certainly involve curtailed use of the private car and consequent use of public transport. The central shopping area will provide a suitable site for clusters of durable goods shops so that a clothing area, a shoe area, an electrical goods area, may be distinguished. Department stores, variety stores, and shops selling highly specialised products are also likely to be viable in this location. The strength of the supra-regional centre will lie in its centrality and the range of its facilities and its consequent attractiveness for widely scattered customers. It will generally require a market area with 500,000 or more of a population. The nature of the typical shopping trip, as for the regional centre, will be for purposes of comparison.

39. In practice the clearcut stages of the shopping hierarchy in a city region are likely to be blurred, and the relationships between the various centres and levels are likely to be continually changing. Nevertheless the centres at each level in the model represent a meaningful aggregation of functions, each one incorporating the characteristics of the level below it, and it provides a useful basis for planning. To gain the potential advantages of the model hierarchy in scale, transport and communication economies, and in opportunities for consumer comparison and choice, a population distribution should, as far as possible, foster the distinct development of the different types of centre. In particular, a distribution might try to encourage the development of the maximum number of higher order centres on the grounds that a regional centre, for example, can offer some things that cannot be offered by an accumulation of district centres and can offer other things more advantageously. While the creation of a model shopping hierarchy is not, by any means, a dominating factor in selecting an optimum distribution of population, it can be a helpful indicator.

40. We examined possible distributions of population and of retail facilities for Tayside in the light of the following considerations: (a) creation of the largest possible number of higher order centres; (b) creation of market areas that would allow higher order centres to achieve their full potentials and all centres to have populations in their market areas that would let them prosper at their particular levels. This suggests favouring a population distribution that would justify the provision of sufficient shops and floor space in Dundee to develop it as a supra-regional centre; in Perth to confirm and develop it as a regional centre; and in a number of communities to establish and develop them as district centres. In addition, the concept of the local centre serving a population of a few thousands was used, with other guides, to help us consider the more detailed location of population.

41. The implications of these proposals for Dundee, and an outline policy for shopping in the City, are described in an Appendix to this chapter.

Projection of Retail Floor Space Requirements

42. The bases for predicting floor space requirements are: (1) the demographic characteristics of future popu-

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[1] Accessibility trade is here defined as all trade done in convenience goods shops together with trade done in durable goods shops such as chemists, drapers, hardware, where proximity to the customer's home is the most significant factor in explaining why one shop rather than another is visited. Attraction trade is that done in durables where the characteristics of the shopping centre especially quantity and quality of shops 'attracts' the customer and facilitates comparison shopping.

lation; (2) future *per capita* expenditure on retail goods; (3) future sales per square foot of gross selling space. The location of new floor space will depend also on (i) the location of future population, (ii) the location of present floor space, and (iii) the proportions of retail expenditure that will be spent,in the future, at different levels of the shopping hierarchy.

43. The demographic characteristics of end possible locations for future population are discussed in other chapters. Estimated retail expenditure in Tayside is available from the 1961 Census of Distribution (Table 16.1). In *The National Plan* (Cmnd 2764) retail expenditure was assumed to increase by 2.4% *per capita* per annum in the period 1960–1970; but that rate was not achieved, the estimated rate of increase being about 2% per annum. For this Study, a lower limit of 2% growth *per capita* per annum and an upper limit of 3% were assumed for 1971–2001. It may be that, given an above-average rate of development, incomes and retail expenditure in Tayside would grow faster than 3%, but there is a countervailing factor because new immigrants tend to be young and to have children and this lowers retail expenditure per head. On the basis of a 2% rate of increase from 1961–2001, *per capita* retail expenditure by the year 2001 would be about £360 per annum; and total retail expenditure, given an increase of 300,000 in population, would be around £270 million, with about £110 million of this attributable to the increase in popluation. With a 3% growth rate from 1971, *per capita* expenditure would rise to about £480 per annum, and total retail expenditure would be around £360 million, with the increase attributable to the increase in population being of the order of £140 million.

44. There is considerable divergence between average retail turnover per square foot for Tayside and comparative data for traders 'of average ability' retailing in efficiently-designed premises. [1] Thus there appears to be opportunity in Tayside for increasing productivity in the short run by modernising existing shops and in the longer run by replacing them with more efficient outlets. Above-average improvements should be possible for standardised regularly-purchased items susceptible to economies of mass retailing, with lower rates of increase for durable and specialist goods bought intermittently and for which large space-expensive stocks are necessary to provide choice.

45. Increasing retail expenditure will encourage, and redevelopment will contribute to, more efficient use of floorspace. It seems reasonable to assume that, by the end of the century, improvements in the productivity of the existing quantity of floorspace in Tayside would go most, if not all the way, to meet the additional expenditure attributable to the existing level of population even if expenditure increased at 3% per annum. The additional capacity required by an increment of 300,000 people by 2001 could then be in the range 2–4 million square feet for all types of goods. [2]

46. It is important to distinguish between the extra space required for accessibility and for attraction goods. The location of new retail floor space for accessibility goods usually bought in local or district centres, will depend overwhelmingly on the future distribution of population. The location of new space for attraction goods, which are for the most part durable and specialist goods usually bought in regional or supra-regional centres, will be heavily influenced by the present location of floor space and the proportions of future expenditure to be spent on different classes of goods.

47. We expect expenditure on accessibility and attraction goods to become increasingly separated with the latter going, almost entirely, to regional and supra-regional centres. No new regional centre is envisaged for Tayside by the year 2001, on the basis of the proposed distribution of population, and by far the greater part of increases in expenditure on durable and specialist items is expected to be absorbed by Dundee and Perth. In 1961 accessibility goods accounted for over 70% of total retail turnover. If expenditure on accessibility goods is as high as 70% of total retail expenditure in 2001 (and it may be less) there would be 30% of £270–£360 million a year to be spent on attraction goods by the Tayside population. Some £30–£40 million of this would be attributable to additional population. If this increment were all spent in Dundee and Perth it would create a requirement for additional floor space of 0.6 to 1.3 million square feet (allowing for the lower productivity of attraction floor space). In fact the additional space needed in the two cities would depend also on the net regional balance of outflows and inflows of expenditure, and on leakages from Dundee and Perth to lower order centres. Moreover,there would be a balance to be taken into account if increases in the productivity of existing floor space exceeded or fell short of the rate of increase in retail expenditure by the existing level of population.

OTHER SERVICES AND OFFICES

48. No examination in depth has been undertaken of the following categories and their floor space requirements.

(1) Certain non-retail shops, *eg* fish restaurants, laundrettes, none of which was included in the 1961 Census of Distribution.

(2) Centres of entertainment, *eg* theatres, cinemas; centres of recreation, *eg* swimming pools, ice-rinks; and centres of community

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[1] *A Method of Estimating Retail Floor Space Requirements in Small and Medium Size Towns Outside the Conurbations*, Ministry of Housing and Local Government, 1967, p. 11.

[2] Turnover averaged £15 per square foot in Tayside in 1961. A turnover of £25 per square foot was, however, being achieved in the more modern shops. It is assumed that productivity in Tayside can increase sufficiently between 1961 and 2001 to handle, with no increase in aggregate floor space, an additional retail expenditure of 2% per annum from 1961 to 1971 and as much as 3% thereafter. On this basis the demand for additional floor space will be attributable solely to the retail expenditure of the population increment. It was assumed that future investment in shops would be in facilities comparable to those which in 1961 achieved a turnover of £25 per square foot. If we assume that facilities of this nature can achieve a 1–2% increase in productivity per annum over the period to 2001 (see D Diamond, *Grangemouth/Falkirk Regional Survey and Plan*, HMSO, 1968, Vol.1, p.75.) then turnover in that year would average between £35 and £55 per square foot. In the case of 'space-expensive' durable and specialist items turnover might average between £30 and £45 per square foot.

life, *eg* churches, halls.
(3) Wholesaling and storage.
(4) Offices.

49. The requirements of category (1), even with substantial population expansion, are unlikely to be important and probably lie within the margin of error of the general retailing projections. As for centres of entertainment and community life, our evidence is that the present situation is one of some surplus of capacity. Where there were deficiencies, they seemed to arise from the inadequate quality of the services with any additional space likely to be required to make them good being negligible or small. The future space requirements of this category, given existing structures and some surpluses of capacity, are unlikely to raise more than local problems. Allowance has been made for their requirements in the areas shown as possibilities for new communities or the expansion of existing communities (Chapter 4 and Part 3).

50. Dundee and Perth are the only notable wholesaling centres in Tayside. The Perth Case Study (1965), referred to in Chapter 25, suggested that the floor space used for wholesaling and storage (a large part of it being used for the bulk storage of whisky) might be of the order of 1 million square feet with a third to a half of that in the central area. No similar data are available for Dundee. It is known, however, that some wholesaling and storage has moved out from the centre of Dundee in recent years, but there is still substantial capacity within the central area and probably a greater floor space is given over to this function than to retailing.

51. While wholesalers and some storage capacity have, in the past, tended to adopt central sites close to the urban core, increasing diseconomies of central location and other changes are tending to favour more peripheral sites. Our estimates of the amount of industrial land required in each area have taken this into account (Part 3).

52. Although the largest concentrations of office space are to be found in Dundee and Perth, offices are an important land use in other centres, notably the county towns of Forfar and Cupar. Offices tend to occupy areas that have high land values, the greatest number of alternative uses, and the highest levels of traffic congestion. In addition they probably occupy a greater area of floor space than that devoted to retailing.

53. The future demand for office space may be divided into three categories. First, there are offices for professional and personal services such as banking, insurance, law, accountancy. Most of these, in Tayside, will be relatively small. Secondly, there are offices that are integral parts of local commercial and manufacturing firms. They will vary in size from many relatively small ones to a few employing hundreds of people. Thirdly, there are substantial commercial and government offices that may be attracted in to the region. New activities of the third class need not come to central locations (in Dundee or Perth). Offices of the second class will go, by and large, with their operating establishments and it is unlikely that new manufacturing firms would need to have these offices in central areas. The size of the first class, covering a wide variety of activities, is likely to be directly related to the size and growth of population (possibly because there is little scope for economies of scale) with its demands for space increasing rather more rapidly than the demands by shops. Many of the firms in this class will want to occupy central area sites and their combined demands are likely to be substantial. We have not attempted directly to estimate what the additional space requirements would be but it seems possible that existing and new offices would claim more floor space in the central urban areas, at least in the larger centres, than would be required by shops.

54. The increasing use of cars, particularly by customers, and shop or office employees, will require the careful siting and provision of car parks. Parking has emerged as a competitive weapon between centres, but no regional or supra-regional centre will be able to supply all the vehicle space that could be demanded by unrestricted use of the private car. Some restraint and creation of priorities will be necessary, for in some cases the ability to provide adequate parking will in large measure determine the viability of particular shops and the ability of some offices to attract certain employees. In addition, a greater turnover per square foot will engender increased delivery and distribution trips. A three-fold increase in productivity, as envisaged in paragraph 45, could lead to a considerable increase in the use of delivery vehicles which will require easy access to loading and unloading points.

CONCLUDING REMARKS

55. Any long-term projection of service requirements is highly speculative and can suggest only broad outlines for a regional policy framework. Assumptions and projections must be constantly reappraised in the light of changing circumstances. The importance of retailing in terms of land use, employment, traffic generation, etc. led us to use it as the basic structure for our analysis and recommendations in this chapter. But we must emphasise that the provision of shopping facilities cannot be planned or undertaken in isolation from the other functions and especially service functions competing for locations within the urban area.

56. None of the competing claims on urban land (and especially for sites within a central area) can be considered in isolation. It is useful to think of offices, wholesalers, storage, places of entertainment, and traffic to them, etc., as sub-systems within the urban area, each influencing and being influenced by the other. We have formulated a number of working hypotheses suitable for testing by future studies rather than statements of fact on which planning policies can be based. Rising population within Tayside is likely to increase the demand for central sites and the road networks that serve them. It might be argued that market forces should produce the appropriate land-use pattern but there are numerous and formidable frictions in the market for land. Thus in the absence of planning policies there may be waste of the community's resources. We have noted that certain facilities need central locations, *eg* high-order shopping facilities and certain types of offices, while others, *eg* accessibility shopping and some wholesalers and storage,

can operate effectively on peripheral sites. It is clearly in the community interest to assist these forces or at least not to impede them and, in particular, to keep central locations for the activities that will use them best in terms of social costs and benefits. In this context, we believe that pressure on the central area road network due to the build-up of offices in Dundee is likely to justify planning for the decentralisation of offices in the long term.

57. For the region as a whole, we have indicated a possible distribution of a larger population consistent both with a certain structure of shopping and service centres and the concept of a regional city. Given the suggested structure, there are important implications for the phasing of population growth. It would seem appropriate that the population distribution at any given time should ensure that the relative positions of centres are not seriously out of line with the proposed hierarchy of supra-regional centre (Dundee), regional centre (Perth), and district centres.

Appendix to Chapter 16

RETAILING IN DUNDEE

A.1. Dundee is the most important shopping centre in Tayside, with the largest number and variety of shops and absorbing about 45% of the region's retail turnover.

A.2. The 1961 Census of Distribution showed that Perth and Aberdeen had higher turnovers per head of population than Dundee (£270 and £213 respectively against £181) suggesting larger net gains than Dundee from their respective hinterlands and from farther afield. If it is assumed that the population of Dundee spent per head the same as the average for Scotland (£169) in 1961, Dundee's total trade would have been £30.7 million. Actual turnover was £33.1 million indicating a net gain of £2.4 million.

A.3. Dundee had a lower turnover *per capita*, per outlet and per employee, than such towns as Aberdeen, Perth and Kirkcaldy (with the exception of turnover per employee in Perth). These rather inadequate measures of productivity suggest that there is scope for relative improvement in the efficiency of retailing in Dundee.

A.4. Retailing provided jobs for 1 in 10 persons employed in Dundee in 1966. Over the period 1951–1962 employment in retailing increased from 7,200 to 10,500 and, as a proportion of employees, from 8.2% to 11.3%. In the period to 1966, however, employment fell to 9,300 (10%).

A.5. Table 16.4 gives the numbers and types of shops in Dundee. In the period 1954–1966 the number of shops fell by rather less than 1,000, or by more than 25% of the 1954 total of 3,700. The decrease has been particularly marked among small independent grocers faced with competition from chain supermarkets. A variety of factors including competition from larger-scale lower-cost outlets, abolition of resale price maintenance, and urban redevelopment, have closed many shops in the miscellaneous category. In addition to the outlets in Table 16.4, other methods of retail distribution (including automatic vending, street trading by van) are in operation. Their turnover is not known but is not likely to be significant.

Hierarchy of Shopping Facilities in Dundee[1]

A.6. An intra-urban hierarchy of shopping facilities can be distinguished. The constituent levels are the Central Shopping Area; two district centres at Lochee and Broughty Ferry; three linear 'parades', extending from the Central Area along Perth Road/Hawkhill, Hilltown, and Princes Street / Albert Street; a number of neighbourhood clusters; and a plethora of isolated corner stores. The Central Shopping Area lies within the area which has contained the urban core of Dundee since mediaeval times. The Lochee district centre developed on the site of the 'village of Lochee' which experienced rapid growth during the textile boom of the nineteenth century. The Broughty Ferry centre has grown to meet the requirements of an area which 'variously assumed ferry, fishing and resort functions before its chief role came to be as a middle and upper class dormitory for Dundee'.[2] Lochee was incorporated into the City in 1859 and Broughty Ferry in 1913 but both have maintained a degree of social independence which is reflected in their respective shopping patterns. The three linear parades developed from the urban core of Dundee along routes which themselves were the *loci* for textile establishments and the homes of their

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[1] A number of articles have recently appeared which provide background material for a study of retailing in Dundee:
W.H.K. Turner, 'Growth of Dundee' *Scottish Geographical Magazine*, 1968, pp. 76–89.
D.C.D. Pocock, 'The Urban Structure of Dundee' in *Dundee and District*, ed. S.J. Jones.
D.C.D. Pocock, 'Shopping Patterns in Dundee', *Scottish Geographical Magazine*, 1968, pp. 108–116.

[2] Pocock, *ibid.*, p. 113.

TABLE 16.4 Shops in Dundee, 1954–66

TYPE	*1954*	*1959*	*1963*	*1964*	*1965*	*1966*
Grocers	628	585	476	469	408	410
Other food shops, restaurants, etc.	1,115	1,078	1,049	1,051	1,006	983
Drapers, outfitters, milliners, shoes, etc.	338	287	260	260	247	246
Furnishings	279	218	259	296	304	313
Newsagents, tobacconists	253	223	173	184	215	217
Chemists	85	79	80	77	74	72
Plumbers, glaziers, ironmongers	80	81	81	75	78	78
Hairdressers	122	105	136	135	135	136
Motor and cycle accessories	71	63	64	75	76	75
Miscellaneous	408	318	302	324	292	257
	3,739	3,037	2,880	2,946	2,833	2,787

Source: Chief Sanitary Inspector, Dundee. The classification used differs from that of the Census of Distribution, 1961.

TABLE 16.5 Relative Importance of Central Shopping Area in Dundee, 1961

Type of Shop	*Shops in C.S.A.*	*% of Dundee shops in C.S.A.*	*% of Dundee turnover in C.S.A.*
		%	%
Grocers	25	5	10
Other food	52	13	25
Confectioners, tobacconists, newsagents	47	17	28
Clothing and footwear	98	38	82
Household goods	59	38	72
Other non-food	57	32	63
General stores	14	86	N.A.
	352	20	c.51

Source: Census of Distribution, 1961.

workers. These parades may be divided into functionally separate entities corresponding to local centres.

A.7. Though there has been little numerical population change over the past 40 years a considerable re-housing programme has been completed in new estates on peripheral sites. These are serviced by planned neighbourhood shopping clusters designed to meet only local needs.

A.8. For the most part, shopping facilities in Dundee reflect the population distribution of the late nineteenth century, the direction of major traffic arteries, and a 'local needs only' policy towards the provision of facilities in new housing estates.

The Central Shopping Area

A.9. In 1961 the Central Shopping Area had 20% of Dundee's retail outlets but handled over 50% of the City's turnover (Table 16.5). 80% of the CSA turnover was in durable goods and 20% in convenience goods. It attracts considerable trade, especially in durables, from outside the City. The CSA is in a period of transition. Since 1961 its capacity and attractiveness have been increased considerably. A comprehensive scheme is being completed in the Overgate and further development is planned for the Wellgate. A study by Dundee College of Technology in 1967 showed that about 75% of shoppers in the Central Area originated from within 2½ miles and over 90% from within 15 miles of the centre. More than half came by bus, about a quarter by car, a quarter on foot, and a very small proportion by train.

A.10. *Lochee* is a highly congested linear centre located astride the main Coupar Angus road and serving a contiguous market area of high-density housing (mainly working and lower middle class). A large redevelopment scheme has been proposed which would greatly increase the capacity (turnover and parking) of the centre. The scheme envisages 17,000 square feet of gross space of which 7,400 square feet would be for storage.

A.11. *Broughty Ferry* is a thriving district centre catering for a predominantly middle and upper class market. Motorised shopping is encouraged by the grid pattern of the streets.

A.12. *The Hawkhill* parade, predominantly composed of small independent shops, will be demolished in the near future, leaving the adjacent cluster in the Perth Road. *The Hilltown* parade, on the other hand, is benefiting from the close support of multistorey housing developments in its immediate vicinity. *The Albert Street/Princes Street* parade has a high proportion of relatively small independent shopkeepers. The parade has a larger total of shops than either Broughty Ferry or Lochee but lacks the large stores that would make it a district centre.

A.13. The inter-war and post-war housing estates are serviced by planned *neighbourhood clusters* of shops providing convenience goods. The largest of these is at Ardler.

Dundee's Trading Area

A.14. It is possible to define primary, secondary and tertiary areas for Dundee (Table 16.6). The primary trading area is the City of Dundee. The secondary trading area includes centres which are 'subordinate' to Dundee in the sense that attractive shopping facilities in Dundee have militated against their development as district centres. The tertiary hinterland includes developed district centres and looks to Dundee for its regional shopping.

A.15. Within the *secondary trading area* shoppers meet their convenience needs locally but tend to travel to the Dundee CSA for durables. Tayport, Newport, Wormit, Invergowrie, Monifieth and Carnoustie show a similar dependence on Dundee.

A.16. The *tertiary trading area* is characterised by a number of thriving 'autonomous' district centres including Arbroath, Forfar, Kirriemuir, Brechin, Montrose, Cupar, St Andrews, Blairgowrie. These provide a full range of convenience goods and a good range of durables for their contiguous market areas. The evidence from our enquiries suggests that competitive centres to the north (Aberdeen), south (Kirkcaldy) and west (Perth) attract a significant proportion of regional shopping expenditure from the Dundee tertiary trading area. Indeed only shoppers from Brechin, Arbroath, Forfar and Kirriemuir show a decisive tendency to travel to Dundee for their regional requirements. Perth is an attraction for customers from Coupar Angus and

Blairgowrie; Kirkcaldy exerts a strong pull on Cupar and St Andrews; and Aberdeen attracts regional shoppers from Montrose.

The Present Pattern of Retailing in Dundee and Planning Policy

A.17. (1) Dundee had, in 1961, a smaller net gain than might have been expected. This suggested that, partly in consequence of its topographically restricted market area, Dundee provided a smaller range of services than might have been expected for a city of its population and, consequently, lost trade to competing centres such as Perth, Aberdeen and Kirkcaldy. Recent redevelopment of the Central Shopping Area may improve the situation, but there have also been improvements in competing centres.

(2) The location of Dundee's major shopping places, other than Broughty Ferry, either in the central area or astride main traffic arteries, means that they suffer severely from traffic congestion. Moreover redevelopment, while it has increased the attractiveness of Dundee as a regional shopping centre, has also increased the central area's popularity as a district centre and some shops (grocers, chemists, etc) located in the central area might be expected to function economically in more peripheral locations. Concentration of central area functions, including shopping, is eminently suited to movement by public transport along fixed radial routes. But the increasing use of the motor car has provided the opportunity and the necessity (because of parking and congestion costs) for the dispersal of as many functions as possible from the central area.

(3) One-stop bulk convenience shopping by car is pushing the neighbourhood clusters of the peripheral housing estates out of line with modern consumer behaviour. In addition the average size of shop is small and the economies of large scale retailing are not achieved.

A.18. The last written policy statement on shopping facilities within the City of Dundee appears to be *The City of Dundee Development Plan: Composite Written Statement 1966.*

TABLE 16.6 Retail Turnover in Dundee Trading Area, 1961

AREA	*Turnover 1961 £000*	*Estimated Population*
DUNDEE CITY CENTRE	15,387)	182,959
DUNDEE CITY DISTRICTS	17,702)	
TOTAL PRIMARY TRADING AREA	33,089	182,959
Monifieth	351	3,475
Camoustie	879	5,511
Teyport	384	3,151
Newport	318	3,326
Monifieth DC	212	7,702
Camoustie DC	68	6,617
TOTAL SECONDARY TRADING AREA	2,212	22,434
Arbroath	3,752	19,533
Brechin	1,565	7,114
Forfar	2,202	10,252
Kirriemuir	763	3,485
Montrose	2,608	10,702
Brechin DC	158	4,921
Kirriemuir DC	92	4,515
Forfar DC	385	7,078
Montrose DC	56	5,606
Cupar	1,877	5,495
St Andrews	2,349	9,888
Part of St Andrews DC[1]	285	6,065
Part of Cupar DC[2]	60	1,224
Alyth	619	1,862
Blairgowrie	1,385	5,158
Coupar Angus	431	2,049
Part of Eastern DC[3]	196	6,296
Part of Perth DC[4]	876	19,409
TOTAL TERTIARY TRADING AREA	19,559	130,661
OVERALL TOTAL	54,860	336,064

1. Includes the Parishes of Leuchers, St Andrews and St Leonerds, Cemeron, Forgan; Ferry Port on Creig.
2. Except the Parishes of Abdie, Auchtermuchty; Ceres, Collessie; Creigh; Dunbog; Falklend; Kettle; Newburgh.
3. Except the Parishes of Caputh; Cargill; Clunie; Collace; Lethendy.
4. Includes the Parishes of Inchture; Longforgan, Abernyte.

Source: Census of Distribution, 1961.

'The Central Area which comprises the main business, shopping, civic and cultural activities of the City has an area of approximately 164 acres exclusive of major roads and is bounded by South and North Tay Streets on the west; Dudhope Street and Victoria Road on the north; Kings Road/Allan Street on the east and Dock Street and the river front on the south. It is intended that considerable development will take place in the Overgate and Wellgate areas.

'It is intended that the principle of segregating pedestrians from vehicles already adopted in the completed section of the Overgate CDA be adopted in the Wellgate CDA and also in those sections of High Street, Murraygate and Seagate lying between these areas and in such other parts of the Central Area as may be appropriate.

'Apart from the local shopping facilities to be provided throughout the residential neighbourhoods it is proposed to encourage the redevelopment of the main sub-centres at Lochee, Hilltown, Princes Street and Broughty Ferry and to establish a new centre at or in the vicinity of Happyhillock to serve the new housing areas to the north-east of the City' (p.16).

The Happyhillock scheme seems to have been replaced by a scheme for a district centre at Whitfield.

A.19. While the foregoing provides a sound planning framework, there is need for a more fully developed policy statement which takes account of the general proposals of this report; the effect, especially on the City centre, of shopping trips as a factor in increasing congestion cost; the provision of centres that meet the tastes, habits and requirements of shoppers in Dundee; and the number, size and location of shopping facilities that would be economically viable.

Future Trends

A.20. The more important general trends are discussed in paragraphs 22 to 32 of Chapter 16 and a possible model hierarchy of shopping centres is discussed in paragraphs 33 to 41.

CONCLUSIONS

A.21. Our analaysis suggests some tentative conclusions about shopping provision in Dundee.

A shopping hierarchy would be a Central Shopping Area for comparison and specialist shopping together with five district centres; the existing centres of Lochee, Broughty Ferry, Hilltown, Albert Street, and a new one in the vicinity of Whitfield. The district centres would be supplemented by groups of one to three corner stores carrying a range of casual convenience goods.

A.22. Success in making the CSA a more attractive centre would lead to a rise in shopping trips to the centre of Dundee. To minimise congestion costs, it would be desirable that shops that could operate no less efficiently and conveniently outside the CSA should, where feasible, disperse to the district centres. Ideally only those specialist and comparison shops which require large hinterlands should locate in the CSA together with some casual convenience goods and durable goods shops to serve customers who shop from work places in the urban core or for whom the CSA is also their district centre.

A.23. District shopping centres should be adapted to motorised shopping and should provide adequate parking space. Through traffic should be channelled off from that destined for the centre, and within the centre pedestrians should be segregated from vehicles. Rents in redeveloped district centres are likely to be high and it would aid the viability of such centres if their development preceded further CSA shopping development. Such a policy would have the added advantage of reducing congestion costs in the CSA by providing alternative opportunities for shoppers destined there from peripheral areas. Moreover the development of strong district centres would speed the run-down of the old shopping parades to a number of local clusters. However, the continued existence of numerous neighbourhood clusters could impair the development of viable district centres which might in the long run provide better and less costly services, and the planning authority might encourage in these parades voluntary mergers of outlets and their relocation in district centres.

A.24. Even with stronger district centres, much shopping, especially for convenience goods, will continue to be done on foot. Corner shops (alone or in groups of two or three) should be located to meet these needs.

A.25. These conclusions, and development elsewhere, suggest the following comments on retailing in Dundee in the short term.

(a) The timing of further redevelopment of the CSA, especially the Wellgate, should be reconsidered in the light of possible over-capacity in regional shopping facilities and the increased attractiveness of the City centre to motor vehicles and the concomitant parking and congestion costs.

(b) It would be advantageous if the redevelopment of Lochee *preceded* the Wellgate scheme to provide an intervening opportunity to southbound traffic for the City centre.

(c) Urgent consideration should be given to completing development of a district centre at Whitfield.

A.26. In general, additional population in the immediate area of Dundee could be located in groups which, when developed, could each be serviced by a district shopping centre and strategically located corner shops. While they would then be self-sufficient in convenience goods and casual durables, they would look to the CSA of Dundee for comparison durables and specialist shops. In time, a number of additional district centres, adapted to motorised shopping, would be required in such areas as Longforgan, Murroes, Friarton, and north of Carnoustie. The last of these centres might, in the long run, be developed as an out-of-town shopping centre offering a range of goods and services equivalent to those provided in the central shopping area of a car-orientated regional centre.

A.27. In the short run, the Dundee CSA should be able to handle a substantial increase of expenditure on comparison durable and speciality goods without further provision of floor space. In the long run more space will be needed: given an increase of +300,000 in Tayside population, this additional demand may be 0.5 to 1 million square feet.

17 Housing

1. The provision of sufficient houses of adequate quality is a pre-requisite for the successful economic expansion of a region. Moreover the quality of a region's housing stock is an important aspect of its image and reputation.

2. Tayside can provide a substantial number of high amenity sites which would be sufficient to house the maximum remit increase in population. This, together with good standards of housing and an imaginatively planned variety and choice of environment, could make it a most attractive region in which to live and work.

3. This chapter begins by assessing existing housing conditions in Tayside. A second section examines recent trends in house building and redevelopment and current programmes, and considers them in relation to changes in the total number of dwellings. A third section assesses future housing needs emerging from dwellings becoming obsolete and from the proposals for population expansion.

EXISTING CONDITIONS

4. We confined our study of existing conditions to what could be ascertained readily from existing sources about the 159,000 dwellings that constituted the Tayside housing stock in 1966. Thus we selected, from Census data, four basic factors as indicators of housing conditions; houses built since 1945; owner-occupied and rented housing; the presence of basic facilities; and overcrowding.

Houses built since 1945

5. Information about the age-distribution of the housing stock is not available without a special survey. However the published Housing Returns for Scotland allow the proportion of houses built since 1945 to be assessed. This gives a measure of the scale of investment in housing in the post-war period and indicates indirectly the numbers of pre-war houses remaining.

6. Table 17.1 shows that, in 1966, 31% of dwellings in Tayside were of post-war construction compared with a Scottish figure of 35%. The Tayside percentage is lower even although Dundee, Forfar, and Monifieth did better than the Scottish average, and Perth and Arbroath achieved the average. There is, however, no New Town in the Region and it has not enjoyed as much SSHA activity as other places; it also includes a number of small towns and other areas in which population has grown very slowly, or not at all, in the post-war period. Only 8% or so of the houses in Crail are post-war and there are eight other burghs with proportions of less than 20%. Monifieth represents the other extreme with 51% of its houses having been built since 1945. The corresponding figures for the Counties of Angus and Perth are 22% and 21% respectively. Such housing development as has taken place in landward areas adjacent to burghs has been offset by more limited changes in the smaller villages and the rural and remoter parts of the counties.

Owner-occupied and rented housing

7. Attempts to attract population to a region are likely to be frustrated unless dwellings in the desired tenure groups are available. Table 17.2 shows Tayside to have a lower proportion of dwellings rented publicly than Scotland as a whole, but to have a lower proportion of owner-occupiers. The reason is that private dwellings for rent are a more significant proportion of the total stock in Tayside than in other parts of Scotland. Comparison with West Central and East Central Scotland, using 1966 Census data, show them to have lower proportions of privately rented and higher proportions of publicly rented dwellings than the Tayside Region. The privately rented tenure group is one that is diminishing nationally, and while a stock of privately rented dwellings could be of advantage to an area seeking to attract population, it is doubtful whether the quality of much of the privately rented stock in Dundee and elsewhere in Tayside is of such a nature as to be attractive to families that might move into the Region.

8. The chief contrast in Table 17.2 is between the tenure distribution in Scotland and that in South Hampshire, the latter being representative of the South of England. The images of the typical Scottish householder being a council tenant while the typical householder in England is an owner-occupier is clearly

TABLE 17.1 Dwellings built since 1945

Area	*Total dwellings 1966*	*Dwellings built since 1945*	*Proportion of total dwellings built since 1945*
Tayside	159,120	48,830	31%
Dundee	63,780	23,060	36
Scotland	1,690,640	600,160	35
Edinburgh	157,240	38,640	25
South Hampshire[1]	253,150	93,570	37
Southampton[1]	86,300	17,600	27

[1] The South Hampshire and Southampton figures relate to 1965 and are included to allow comparison with an expanding region in the South.

Sources. Census (10%)1966; SDD Housing Returns, South Hampshire Study, Supplementary Vol.ii, p.55.

TABLE 17.2 Owner-occupied and Rented Dwellings, 1966

Area	*Owner-Occupied* %	*Rented (public)* %	*Rented (private)* %	*Other tenures*[1] %	Total %
Tayside	27	39	23	11	100
Scotland	28	47	18	7	100
South Hampshire[2]	48	22	24	6	100

[1] Includes tenures held by virtue of employment, including married quarters provided by the armed services, tied agricultural cottages, and some smaller unclassified groups.

[2] The South Hampshire figures relate to 1961.

Sources: Census (10%) 1966; South Hampshire Study

illustrated. A further, and related, characteristic is that the average local authority tenant in Scotland pays a considerably lower rent than the council tenant in England and Wales. At the end of 1968, the average standard rent for a local authority dwelling in Tayside – an average that masked considerable variations among different local authorities – was estimated by us to be a few pence more than the Scottish average of 21s. 1d. a week.

9. The proportions of owner-occupied dwellings vary considerably among the towns in Tayside. Dundee, where 19% of the 60,000 or so tenures recorded in the 1966 Census were owner-occupied, is at the lower end of the range while its residential neighbour Newport marks the upper end with 65% of its dwellings owner-occupied. Dundee had the lowest proportion of owner-occupiers of all the Scottish cities, Glasgow having 20% and Edinburgh, in marked contrast, as many as 47%. The low proportion of owner-occupiers in Dundee is a consequence partly of substantial local authority housing programmes (as are the proportions in Arbroath (24%) and Forfar (25%)) and partly of the construction of many private houses outside the City. Thus Monifieth (56%) follows Newport at the upper end of the range because of its high level of private building in recent years. In the five East Neuk burghs, the percentage of owner-occupiers is high, ranging from 45% to 55%.

Basic facilities

10. The proportion of households with exclusive use of hot and cold water, a fixed bath and an internal water closet throws some light on one aspect of the quality of a housing stock. Table 17.3 shows that Tayside compares rather unfavourably with both West Central and East Central Scotland by all three tests relating to the presence of basic facilities. Unfortunately the figures relate to households and not to houses, but comparison would be invalid only if the three regions had different proportions of sharing households: analysis of the 1966 Census data has shown that this is not so. This consideration and the care needed in interpreting the Census definitions of what constitutes an internal WC limits the scope for comparisons between Tayside and elsewhere. Nevertheless, for what it is worth, in 1961 the proportions of households in Southampton and South Hampshire with exclusive use of all the basic facilities were not very different from the Scottish proportion.

11. Variations within Tayside are again substantial. While 64% of non-sharing households in Montrose had exclusive use of the four basic facilities the proportion for Newport was 94%. Although almost half the burghs in Tayside had proportions higher than the national average, the proportion tends to be low in the larger towns (Dundee, Arbroath). The figures in the landward districts tend to be above the average for Tayside. This pattern is unusual because rural counties have in the past recorded relatively low proportions of basic facilities.

Overcrowding

12. Overcrowding may occur because the size of the family is too great for the size of the dwelling that it occupies, or because there is more than one separate or potentially separate household occupying a single dwelling. The test for overcrowding changes over time, the standard tending to rise with the standard of living and to reflect, at any one time, what the nation thinks it should spend on housing. The simplest form of the first test of overcrowding relates to the number of persons per room, and this measure is used in Table 17.4.

13. Overcrowding is less marked in Tayside than in some other areas of Scotland. Table 17.4 shows that, in Tayside, the proportion of overcrowded households is about half that of West Central Scotland. And there is a higher proportion of households with comparatively high space standards than in the other areas examined; but this, to some extent, reflects the relatively high number of small households in the Region.

14. In Dundee, in 1966, 5.2% (3140) of non-sharing households were living at more than 1½ persons per room; this compared with 4.9% for Edinburgh, 4% for Aberdeen, and 11.8% for Glasgow. The towns popular with holiday visitors or retired people, such as Elie, Crail, Pitlochry, Aberfeldy and Carnoustie, have high proportions of households living at less than ½ person per room: proportions as high as 40% are recorded.

15. The last column of Table 17.4 shows that Tayside has a lower proportion of families sharing dwellings than have West Central Scotland, East Central Scotland, and Scotland as a whole. A principal cause of this comparative advantage has been the high rate of housebuilding in Tayside relative to the rate of increase of population in the past 15 years or so.

RECENT TRENDS

House building

16. Permanent new house completions since 1945, as recorded in the *Housing Returns for Scotland*, were grouped into three-year periods and average annual rates obtained for each period. This is a convenient way of identifying the broad trend while not entirely eliminating short-period fluctuations.

TABLE 17.3 Households with exclusive use of the four basic facilities[1], 1966

Area	*Total households*	*Proportion of households with exclusive use of* All facilities	Fixed Bath	Inside WC
		%	%	%
Tayside	146,120	73	74	84
West Central Scotland	755,120	77	78	87
East Central Scotland	316,710	82	82	94
Scotland	1,600,880	78	79	88

[1] The four basic facilities are hot and cold water, a fixed bath, and an inside water closet.

Source: Census (10%) 1966

17. Housing completions in Tayside have generally been between 8–9% of Scottish completions throughout the post-war period. Between 1964 and 1968 they averaged 2530 dwellings a year by all agencies, rising to 3900 in 1967 and to a new record of over 5000 completions in 1968. The bulk of the increases, 80–90% have been attributable to Dundee and the larger towns.

18. The large increase in output in 1967–68 was achieved principally in the public sector. Private building in Tayside increased from 670 dwellings a year in 1961–63, to 790 a year in 1964–66 and then to 960 a year for the years 1967–68. The annual averages for local authority dwellings for the corresponding periods were 1590, 1630 and 3540.

19. Table 17.5 which shows total completions for the five years to 1968, suggests that private sector activity was relatively more significant in Tayside than in Scotland as a whole. Part of the explanation may be that Tayside does not have a New Town Development Corporation contributing to its public output, nor any large SSHA programme during this period. The percentage show that recent completions in Tayside and Scotland are increasing the differences between tenure patterns north and south of the Border.

20. In the years 1964–68, taking the public and the private sectors together, most dwellings (8,350) were completed in Dundee. Perth comes next with 1350, then Arbroath with 1180 completions. In Monifieth there were 640 completions and other towns in which housing activity was relatively high were Forfar and St Andrews.

21. The ratio of private to public completions varies substantially among the different areas. For the towns where there was a significant amount of building, Monifieth is the extreme with over 70% of its completions in the private sector. Private building has also provided a high proportion of completions in Perth, St Andrews, Cuper, Crieff, Newport, Kirriemuir and Montrose. Where the public sector dominated, either because of an active local authority or inactivity in the private sector, Arbroath is easily the most important with over 80% of completions in the public sector. Dundee is also in this category, as are Brechin, Carnoustie, Forfar, Auchterarder and Tayport. In the landward areas of Angus and Perth there have been relatively high proportions of private building.

Closures and demolitions

22. Rates of new house building have to be considered in relation to the rates at which houses go out of use; their inter-relationship determines the change in the size of the housing stock. Table 17.6 summarises house completions and closures and demolitions in Tayside for the years 1966–68.

TABLE 17.4 Occupancy of dwellings, 1966

Area	*Proportion of non-sharing households living at* more than 1½ persons per room[1]	under ½ person per room[1]	*Proportion of households sharing a dwelling*
	%	%	%
Tayside	3.8	23.3	0.9
West Central Scotland	7.6	16.8	1.1
East Central Scotland	3.8	21.7	1.8
Scotland	6.4	20.4	1.3

[1] Rooms are defined as in the 1966 Census. This includes all living rooms, bedrooms and kitchens used for cooking, whether or not at present in use.

Source. Census (10%) 1966

TABLE 17.5 Completion of dwellings by agencies, 1964–68

Area	*Total* No.	%	*Public* %	*Private* %	*Others* %
Tayside	16,530	100	72.7	25.7	1.6
Scotland	191,760	100	77.4	20.5	2.1
England	1,670,600	100	39.3	58.2	2.5

Sources: Housing Returns for Scotland: Housing Statistics (Great Britain)

TABLE 17.6 House-Building, Closures and Demolitions, Tayside, 1966–68

	1966	1967	1968
Completions	2540	3900	5170
Closures and demolitions	1160	1980	2190

Source: Housing Returns for Scotland

23. About 40,000 new dwellings were completed in Tayside in the period 1955–68 while about 19,000 were either closed or demolished (Housing Returns). Thus the net addition to the stock of houses was only about 21,000 just over 50% of completions. The housing effort of the early 1950s aimed primarily at increasing the stock of houses whereas during the late 1950s and 1960s there was a change to improving the standard of the housing stock by demolishing and replacing the sub-standard dwellings. Tayside reflects national trends in this respect.

24. The proportion of new dwellings available to make a net addition to the housing stock varies considerably among the towns of Tayside. The proportion depends on the rate of new building and the rate of closure and demolition, the latter tending to be higher, but not consistently so, the higher the numbers of sub-standard and insanitary houses. Only 13% of the houses completed in Dundee, in the period 1964–68, represented a net addition to the housing stock, the other 87% being required to offset closures and demolitions. This contrast with the position in some of the small burghs where relatively few demolitions have occurred. Dundee has had, in recent years, a very high share (76%) of closures and demolitions in the Region, and a much smaller share (51%) of completions. Of the other towns, Arbroath and Perth had the largest numbers of closures and demolitions between 1964 and 1968, followed by Forfar and Brechin.

House improvement

25. Closure and demolition may be postponed by improving existing properties, and under the new Housing (Scotland) Act,1969, new procedures and grants are available for improvement work. Broadly two types of grant are available for improvement and conversion. Discretionary grants are given in cases where improvements will bring a house up to satisfactory standard; and standard grants are designed to enable sanitation to be improved so as to tide houses over for an interim period. More than 9,000 houses in Tayside have had grants approved in the years from 1950 to 1967, a figure equivalent to about a fifth of the new houses completed in the same years. Most of the approvals were for discretionary grants, giving about £2 million for about 8,300 dwellings. Virtually all this money went to dwellings in private ownership, 2,230 of them in the burghs and 3,740 in the county areas. The standard grant, which is available only for houses in private ownership, was introduced in 1959. In the period 1960–67 about £150,000 was paid in respect of 1,050 dwellings, about half of it going to the rural areas. The percentage of the housing stock on which grants have been paid varies widely from area to area.

FUTURE HOUSING NEEDS

26. The account in the preceding sections of existing housing conditions and recent housebuilding trends in Tayside does not present a full picture of the quality of the stock or of the recent building. Such an assessment is not readily achieved by present methods of numerical analysis or comparison and must therefore be more subjective. Although the limited comparisons given show Tayside to be generally similar to other areas in Scotland, it would be wrong to conclude that no particular housing problems exist in terms of quantity or quality. In the following paragraphs we assess the large and continuing task that will be required to eradicate substandard housing conditions. In this the quality of the residential environment in all parts of the Region will be of increasing importance. In addition to the groups of substandard dwellings there are at present many areas where the quality of the surroundings are also unsatisfactory and will require improvement and renewal. In the future, for example, the ability of multi-storey building forms to provide high quality living conditions, and their use in a Region where space is not at a premium must be questioned. Equally, in private housebuilding, while much has been achieved in recent years, a position which could be regarded as competitive with other regions in England in terms of quantity, quality and range of choice has not yet been reached. Tayside has however an abundance of potential sites where, in response to a growing demand, a high quality and a wide choice of environment could be offered.

27. Three main components of future housing demand may be distinguished. (Estimated requirements for the period 1971–2001 are in brackets).

(1) Replacing and improving substandard houses (50,000 houses)

(2) Creation of new separate households (14,000 houses)

(3) Increases in population (67,000–107,000 houses)

In addition, a proportion of the housing stock must be vacant at any one time. Thus the number of houses to be added to the stock must exceed the aggregate requirement of (2) and (3) above by whatever number is necessary to be consistent with the vacancy rate assumed.

Replacement and improvement

28. Only some of the dwellings completed in Tayside in recent years have contributed to the net growth of the housing stock because the replacement of unfit houses is currently making large demands on new house building. Firm assessment of future replacement needs is impossible without knowing the standards that will be applied, over the years, to distinguish fit from unfit housing. At present, sanitary and structural criteria seem to indicate priorities for replacement reasonably well in practice: but when these basic deficiences are greatly reduced or made good, we would expect, given the

Scottish situation, that wider environmental needs would gain an important place in the classification criteria. Working with present criteria however, we have assessed the construction programme likely to be involved in rejuvenating the housing stock. This was done by estimating the number of dwellings that are likely to become unfit or to be taken out of use by the end of the century. The estimate is based on data in the 1966 Census and in the report *Scottish Housing in 1965*[1].

29. Returns by local authorities in 1964, recorded a total of 100,000 unfit houses in Scotland. However, the 'Cullingworth Report'[2] estimated, on the basis of sanitary facilities, that 200,000 was a more accurate minimum figure, and the survey by Professor Cullingworth in 1965[1], suggested that, on the basis of length of life, 151,000 houses should be demolished within five years and another 134,000 within the following ten years. The survey also reported that a further 193,000 houses have a life of 15–29 years, 125,000 of these being without a fixed bath or a shower. It appears that the number of houses in Scotland becoming substandard within the 15 years up to about 1980 amounts to nearly three times the number declared by the local authorities.

30. If Tayside's share of Scottish unfit houses is proportionate to the totals of the two stocks then 27,000 dwellings in Tayside (9.4% of 285,000) were in need of attention within 15 years from 1964. In fact the number of houses returned as unfit by the Tayside authorities, at the end of 1964, was 23,310. Discussing the national returns, the *Cullingworth Report* observed that, while a number of returns were clearly under-estimated, those of Dundee and Arbroath, together representing 18,100 of the dwellings returned as unfit in Tayside, were comparatively realistic. It would appear, therefore, to be reasonable to estimate that about 27,000 dwellings in Tayside were in need of attention within the 15 years from 1964.

31. We assumed that the age structures of houses in Tayside and in Scotland are broadly comparable but made allowance for the fact that only 31% of the Tayside housing stock (1965) was built after 1944 compared with 34% of the Scottish stock. We assumed also that the age pattern of dwellings becoming unfit over the next 30 years would be the same in Tayside as in Scotland. The calculation is set out in Table 17.7 which shows Tayside to have 52,500 houses becoming obsolete, in the 30 years from 1966 to 1996. This figure was rounded up to 60,000 to include the years 1997–2001.

32. The dwellings that will become substandard before or by 2001 will be, almost entirely, found among the houses in the present stock that are very small or deficient or relatively old or more than one of these things. Data for each of these classes together with the 1964 estimates of unfit houses are given in Table 17.8 (columns 2–5) for the six principal towns and the rest of Tayside. The aggregates support our estimates of 27,000 houses becoming unfit from 1966 to 1981, and 60,000 from 1966 to 2001.

33. From this assessment of the number of houses that are likely to become unfit over the next 30 years, we formed an estimate of the resulting housing programme. An addition must first be made for replacing those fit houses which have to be demolished to make way for road and redevelopment schemes. In Scotland between 1955 and 1966 10 per cent of all demolitions were houses of reasonable standard. Even without population growth, urban renewal and development will continue in Tayside and it seems reasonable therefore to raise the estimates of the total number of houses likely to be replaced by some 3,000 for the period 1966–81. For the period beyond this up to the end of the century it would appear that the total estimate is sufficiently large to cater for demolitions arising from this source. A

TABLE 17.7 Dwellings becoming obsolete, Tayside, 1966–1996

Date of construction	*Pre–1861*	*1861–80*	*1881–1900*	*1901–1919*	*1919–44*	*Post–1944*	*Total*
(a) Age structure of housing stock, Scotland (%)	4	11	19	10	22	34	100
(b) Estimated age structure of housing stock, Tayside (%)	4	12	21	10	22	31	100
(Number)	6,360	19,090	33,420	15,910	35,010	49,330	159,120
(c) Proportion of each age class, Scotland, becoming obsolete by 1966 (%)	68	66	67	52	7	5	
(d) Tayside dwellings becoming obsolete by 1996, estimated by applying factors in (c)							
(Number)	4,320	12,600	22,390	8,270	2,450	2,470	52,500

Source: Scottish Housing in 1965

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[1] *Scottish Housing in 1965,* J.B. Cullingworth, HMSO, 1967, p.9.

[2] *Scotland's Older Houses,* Report by Sub-Committee of the Scottish Housing Advisory Committee, HMSO, 1967, p.81.

further consideration is the question of how many unfit houses will be replaced and how many improved. With recent legislation directing greater attention and financial assistance towards improvement it is to be expected that the figures quoted in paragraph 25 for past improvement will be considerably increased. Matters of local detail are however involved and improvement will depend on the type and state of the building, the cost of conversion and the standard of the surroundings. In the early years it is likely that the majority of dwellings becoming unfit will be in a flatted or tenement form which will make improvement difficult. If an economic scheme can be worked out, either fewer rooms or the conversion of two dwellings into one may be the result. In addition, demolition of nearby buildings may be required to provide suitable external spaces and parking. On the other hand dwellings deemed to be substandard in later years may be individual houses which are capable of improvement by internal re-equipment and external rejuvenation. Without a detailed analysis of the housing stock, referred to later as a housing defects index, it is therefore not possible to arrive at long term estimates which take into account different ways of rebuilding that stock. Thus we have based the programme on replacing all unfit dwellings by new. The figures are likely therefore to be a maximum, particularly in the later years of the century.

34. The provisional estimates for replacement requirements run from 1966 to 2001. We have taken account of actual building achievements, closures and demolitions in 1966 and later years, and estimated what is likely to happen by 1971 so as to obtain estimates of requirements for the periods 1971–81 and 1971–2001. These considerations reduce the estimates of houses to be replaced to 20,000 for 1971–81 and 50,000 for 1971–2001.

35. Table 17.8 in columns (6) and (7) provides estimates of the replacement needs for the six principal towns and the rest of Tayside for the periods 1971–81 and 1971–2001. These estimates are approximations, their basis being the proportionate distributions of the data in columns (2)–(5) and particularly the estimates of unfit houses and of pre-1945 houses.

36. There has been a comparatively active replacement programme in Tayside in recent years. Building for replacement in 1964–68 was at a rate of 1960 houses per annum; this represented 11–12% of the Scottish total compared with Tayside's 9–10% of the housing stock. The estimates in the preceding paragraphs suggest that an annual average rate of replacement of 2000 dwellings a year would meet anticipated needs in Tayside for 1971–81 with a lower rate of about 1500 houses a year for the following 20 years. We think, however, that there are good reasons for considering a rather faster rate in the short term with the consequence of a rather slower rate in the later years of the century. These matters are discussed in Chapter 18. Given recent performance, an annual rate of rather more than 2000 houses a year should be manageable.

37. It is appropriate to conclude this section by commenting generally on the assessments. While the estimates in columns (2)–(5) of Tables 17.8 are probably sufficient for the purpose of our assessment of housing need, it is desirable that there should be a more uniform basis for assessing unfit houses at the local scale from which meaningful regional or national figures can be prepared. A reassessment by all authorities will be required in any case following the introduction of the new tolerable standard under the Housing (Scotland) Act, 1969. As part of the background to the analysis summarised in this Chapter, a detailed housing defects index was drawn up and tested in appropriate areas in Dundee and Tayport. The index was further developed by the Scottish Development Department and is being used by Dundee Corporation in a comprehensive survey of the City's housing stock. Further work on these lines for the whole Region will be necessary to refine the estimates which we have made. The importance of this is evident from the fact that dealing with unfit housing could account, at the lowest, for more than a third of the total housing programme. In addition, we show in Chapter 18 that about half the replacement programme will involve building houses on new sites. At the same time, the actual rate at which dwellings can be closed and demolished, and therefore the whole redevelopment programme will be influenced by the type and tenure of the buildings concerned. Hence in terms of both the construction programme and land planning, further analysis of the housing stock will be necessary.

New separate households

38. There are two elements in this category of housing demand. First, there is a backlog of families without separate homes. The 1966 Census gave information about households containing more than one family and, where comparison has been possible, estimates of sub-tenants submitted by individual authorities have agreed broadly with the Census figures. These data suggest that about 2000 houses would be needed to provide separate dwellings for all families without seperate houses in 1966. We have, assumed, however, that sufficient houses will be completed between 1966 and 1971 to accommodate the equivalent of the 2000 families deemed to be 'homeless' in 1966, so that no further provision is made for this group for the period 1971–2001.

39. The second element concerns the number of new dwellings required to match the extra households that would be created even although the Tayside population remained at its 1966 level between 1966 and 2001. This requirement derives from rising headship rates, *ie* the increasing proportions of persons in all age/sex/marital status groups who become heads of separate households. Projections of headship rates, in which there is some allowance for an increasing tendency for some people to own more than one house, are given in Table 13 of Chapter 11. These projections were used, together with the relevant population projections, to estimate the numbers of households and the dwellings that they would require. The estimates, the use of which is subject to several reservations, are given in Cahpter 11 (footnote 2 of Table 7A) and show the number of households increasing, in a no-growth situation, from 150,000 in 1966 to 153,000 in 1971, and to 160,000 and 167,000 in 1981 and 2001. The demand for additional houses from the newly-created households (and for some second

TABLE 17.8 Estimates of numbers of dwellings to be replaced or improved in Tayside, 1971–2001

Place	*Indicators*				*Estimates of houses to be replaced/improved*	
	Unfit dwellings 1964	*Occupied houses of 1/2 rooms 1966*	*Occupied houses without fixed baths 1966*	*Pre–1945 houses*	*1971–81*	*1971–2001*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Dundee	15,600	13,620	19,730	40,720	10,500	23,600
Perth	1,000	1,550	3,400	9,370	1,500	3,900
Arbroath	2,500	920	2,320	4,880	1,100	2,100
Montrose	120	740	1,280	2,890	800	1,700
Forfar	825	1,010	990	2,380	450	1,050
St Andrews	55	130	250	2,500	150	750
Rest of Tayside	3,210	4,580	9,610	47,370	5,500	17,000
Tayside	23,310	22,550	37,580	110,110	20,000	50,000

Source: Census (10%) 1966; Housing Returns for Scotland
Returns of Unfit Housing by Local Authorities, 1964

houses) may therefore be taken as 7,000 for 1971–81 and 14,000 for 1971–2001.

Increases in population

40. The range of possible population changes was discussed fully in Chapter 11. For the purposes of this section it is sufficient to estimate the effect on the demand for houses of two rates of population growth, one based on a population increase of 175,000, the other on an increase of 300,000. There are two projections related to each of these increases and, in what follows, we have used the projections that give the higher numbers of households, IMLF 2 for an increase of 175,000 and IMLF 1 for an increase of 300,000. IMLF 2, with net immigration of 3,300 persons a year from 1976 to 2001, suggests that the number of households in Tayside will increase from 150,000 in 1966 to 220,000–236,000 in 2001. IMLF 1, with net immigration of 6900 persons a year from 1976 to 2001, suggests that the number of households will increase to 258,000–276,000. We have calculated the requirement for new houses on the basis of the higher figure in each, *ie* 236,000 and 276,000.

41. Table 17.9 gives estimates of the maximum numbers of additional houses that would be required in Tayside to meet the population increases implied by the remit growth proposals. The corresponding rates over the 30 years from 1971 to 2001 would be of the order of 2200–3600 houses a year, although lower rates (1300–1900 a year) would be sufficient in the decade 1971–81. Some breakdown of these requirements by areas is discussed in Chapters 4 and 5 and in Part III of the Report.

Vacancy rate

42. A proportion of the housing stock is vacant at any one time. Houses may lie empty while households move or while they wait to be sold or re-let or to undergo reconstruction. It is difficult to estimate the size of this component in the future. Recent assumptions in similar studies have ranged around 3% and 4%. The 1966 vacancy rate in Tayside was 3.5% and we have assumed this rate to apply in the years to 2001.

SUMMARY OF HOUSING REQUIREMENTS

43. Future needs for new houses, on the basis of the increases of population in the Study remit, are summarised in Table 17.10. Requirements for replacement and for new separate households are common to both of the growth levels at 64,000 houses by 2001. A population increase of 175,000 is estimated to need a further 70,000 new dwellings by 2001, and an increase of

TABLE 17.9 Remit Population Growth Housing Requirements, Tayside, 1971–2001[1]

	Population increase of 175,000 (IMLF 2) 1966–2001	*Population increase of 300,000 (IMLF 1) 1966–2001*
1. Number of households, 1966	150,000	150,000
2. " " " 1971	155,000	155,000
3. " " " 1981	175,000	181,000
4. " " " 2001	236,000	278,000
5. Increase in households, 1971–81	20,000	26,000
6. " " " 1971–2001	81,000	121,000
7. Deduct increases in numbers of households in no-growth situation		
1971–81	– 7,000	– 7,000
1971–2001	–14,000	–14,000
8. Net increases in households = growth housing requirements[2]		
1971–81	13,000	19,000
1971–2001	67,000	107,000

[1] The estimates for lines 1–4 and 7 come from Table 7A of Chapter 11 (Population). They contain allowances for multiple house ownership.

[2] It is assumed that the requirements arising from the growth in households between 1966 and 1971 will be met by 1971.

300,000 to require an additional 111,000 dwellings. If new households increase at the rates implicit in the higher population projection (IMLF 1) the requirements for the expansion of population will increase from an annual average of about 1,500 houses a year in the quinquennium 1971–76 to an average of about 6,000 a year in the quinquennium 1996–2001. If population actually did increase at that rate, one way of helping to avoid relatively large fluctuations in the demands on the building industry would be to phase the replacement programme to balance, at least in part, variations in the other components of demand. For the first decade, 1971–81, this suggests that replacement building could conveniently exceed 20,000 houses and that the larger part of it should be programmed for the quinquennium 1971–76.

44. Comparing Table 17.10 with Table 17.6 it will be noted that virtually all the estimated housing needs in the 1971–81 period arising from replacement, new household formation and a high rate of population growth could in fact be met by continuing to build at the rate of house construction achieved in Tayside in recent years.

TABLE 17.10 Summary of Housing Requirements, Tayside, 1971–2001

	Dwellings required	
	1971–81	*1971–2001*
1. For replacement (Table 8)	20,000	50,000
2. For new separate households (paragraph 39)	7,000	14,000
3. For remit population growth requirements (Table 9)	13,000–19,000	67,000–107,000
4. For maintenance of a vacancy rate of 3.5% of housing stock (paragraph 42)	700–800	2,800–4,200
A. Total dwellings required given population growth of 175,000 by 2001	40,700	133,800
B Total dwellings required given population growth of 300,000 by 2001	46,800	175,200

18 Redevelopment and Displacement

1. Part of the Study has been to define the economic, social and physical planning implications of a population expansion of up to 300,000 in Tayside. A long-term growth programme associated with such a population increase would have to include the tasks of modernisation and improvement of the evironment and improvement of the standard of living of the existing population. This redevelopment of existing buildings and the provision of homes and employment for the present level of population will have to happen, however, irrespective of population growth, this process may be regarded as the 'basic programme' for Tayside.

2. Even on the assumption of the 1966 level of population continuing to the end of the century, formidable programmes of construction and land acquisition face the Tayside Region. They would represent a considerable proportion of the total programmes that would be necessary over the period 1971–2001, even if the requirements for a large expansion of population were added to those of an unchanging total population.

3. This chapter translates these programmes into land use terms and shows the future land needs of the existing level of population. In Chapter 3 the space standards used in these estimates are more fully discussed.

4. Redevelopment is taken to mean the demolition of a building or group of buildings and their replacement *in situ* or on some other site, it can also be taken to include the improvement of a building *in situ*. Redevelopment in the first sense and redevelopment in the sense of improvement have different effects on land requirements and on people's lives, and their real costs may differ, as may the sources of finance. Owing to increasing space standards it is virtually impossible to redelop an area of buildings and to retain on the same land the original number of units of use. This applies particularly to housing and leads to a demand for land on which to house people who are displaced by redevelopment. Redevelopment is not the only cause of an increasing demand for land, but in a situation of no population growth it is, with an increase in the number of households and changes in industrial structure, a basic source of urban expansion.

5. The term 'displacement' is used rather than 'overspill' because the latter has a statutory connotation which is not intended in the present context. The importance of displacement can be illustrated by an example from the recent past. Dundee's population increased by only 2.4% in the years between 1939 and 1968 whereas the buit-up area of the City increased by 66%. Much of the increase in the built-up area is accounted for by local authority estates, occupied by people displaced by slum clearance.

6. In the following section the overall need for redevelopment is described, the redevelopment needs of individual local authorities being set out in Part 3 of the Report. This is followed by an estimate of the areas of land requirement for displacement in Tayside as a whole, and in the principal subdivisions of the core area.

COMPONENTS OF AN IMPROVEMENT PROGRAMME

Housing

7. The main component of the redevelopment programme is housing. The current need for new housing stems mainly from the poor condition of much of the housing stock, and partly from an increase in the number of households. Even if the population continues at its present level, further new houses will be required as the housing stock ages and as additional households are formed. It is estimated from the Census and from information supplied by local authorities that there is a backlog of about 2,000 families waiting for houses in the Region. For the purpose of the following calculations it is assumed that they will be accommodated by 1971.

8. The total demand for new houses in a 'no growth' situation over the period 1971 to 2001 is set out in Table 18.1 below, on the basis of the assumptions and estimates in Chapters 11 and 17.

Industry

9. There would be a continuing need for new jobs in the period up to 2001 even although there were no change in the level of Tayside population. Given about 185,000 employees in 2001, and an unemployment rate of about 2%, jobs would be required for about 181,000 employees. A reduction in employment in primary industry is expected, and this would probably not be offset by any increase that emerged from the services and construction industries. The net rundown in employment in these sectors could be between 5,000 and 10,000. Many new jobs could be created in the manufacturing sector, but there would also be substantial losses. We have assumed, in a somewhat arbitrary manner from the employment projections in Chapter 13, that as many as 50,000 new manufacturing jobs might be required in the years to 2001 to offset the net rundown in the primary and service sectors and the jobs lost in manufacturing, and to reduce unemployment to 2% or so.

10. Changes in the existing spatial distribution of jobs will become necessary as new housing areas are developed, because some workers will be so far displaced from their original places of residence by redevelopment that it will be difficult for them to travel back to their original places of employment; this requirement is estimated at about 25% of the manufacturing workers displaced from Dundee, Perth and Arbroath and

TABLE 18.1 Basic Housing Programme Required in Tayside, 1971—2001

Dwellings required to replace unfit housing	50,000
Dwellings required for the formation of new households	14,000
Total	64,000

amounts to about 3,500 jobs. The land needed for this purpose is included in the general provision for industrial development in Table 18.3 below.

Ancillary Land Uses

11. There will be a considerable programme of works requiring major capital expenditure on roads, car parking, schools, hospitals, etc., which will be financed out of public funds. Private capital will be involved in a programme of redevelopment, modernisation and relocation of shops, offices and other commercial premises and car parks. Some of these facilities will have to be associated with the population displaced by housing redevelopment to new residential and industrial areas.

LAND USE NEEDS FOR DISPLACEMENT

12. The demand for better space standards when existing buildings are redeveloped will displace people and new buildings to peripheral and even detached sites around existing settlements. Another factor in the process of urban growth is the need for new factory sites by existing and incoming firms.

13. Some land for industry etc. has already been allocated in local authority short-term plans, in most cases there is balance between the programme of construction and the land available for development. In the longer term more land will have to be allocated. While it is not possible to predict precisely the land requirements resulting from the factors referred to in paragraph 12 above, the broad regional requirements (including existing local authority allocations) are set out in the following sections.

Housing Land

14. In calculating the demand for land caused by housing redevelopment it has been assumed that two thirds of the dwellings on sites of unfit housing in Dundee would be displaced. This assumption is based on the high proportion of tenements in the older areas. The amount of new land required is estimated from the density standards set out in Chapter 3. These give an average density of 35 people per net acre of housing, which implies a maximum proportion of 10% of flats. This is a lower density than most local authority housing estates that have been constructed in recent years but takes into account likely future space needs. In the other Tayside towns the displacement is estimated at 50% because of their lower existing densities. The estimates in paragraph 8 above, of the total basic housing programme, also include an allowance for redevelopment of dwellings in the rural areas. It is not considered necessary to make an allowance of new land for this purpose, and the effect is to reduce the total displacement to about half of the total number of new dwellings.

15. The land requirements for housing the population displaced by redevelopment and for the formation of new households are set out in Table 18.2.

16. Over the next 30 years the space demands of individual households may become even greater than assumed above but this could be offset by a lower displacement rate from the more modern housing areas which will be redeveloping in the 1980s and 1990s.

Industrial Land

17. New land required for the expansion of service sectors is considered in the category of Ancillary Land Uses (paragraph 20–22). This section is concerned with the provision of new land for manufacturing on the basis of the estimates in paragraphs 9 and 10 above. An average of 25 workers per industrial acre was adopted on the basis of the assumptions in Chapter 3.

18. It was considered essential not to underestimate requirements for new industrial land. To this end, the calculations for Table 18.3 below make provision for the new manufacturing jobs that would be required to offset the rundown in the primary and services sectors and, arbitrarily, for about half of the manufacturing jobs required to offset jobs lost in the manufacturing sector.

18. The provision made in Table 18.3 is deemed to be adequate for the assumed effects of redevelopment and displacement which would lead, in the larger towns, to people moving to residential areas relatively far from

TABLE 18.2 Land Required for the Basic Housing Programme, 1971—2001

	Approximate Acreage Required
Displacement from redevelopment areas (24,500 dwellings)	2,100
Land for new households (14,000)	1,200
	3,300

TABLE 18.3 New Industrial Land Required for the Basic Employment Programme, 1971—2001

	Approximate Acreage Required
Land needs arising from job losses and displacement (approx. 27,000 jobs)	1,100 acres

TABLE 18.4 Land Required for Ancillary Facilities in the Basic Programme, 1971–2001

	Approximate Acreage Required
Open Space	1,000
Education	450
Other Uses	350
Total	1,800

their original workpleces. In this context, industries employing shift-workers and women are likely to be particularly affected.

Land for Ancillary Facilities

20. In the larger towns (Dundee, Perth and Arbroath) the displacement of population is necessarily associated with the relocation of some facilities and the provision of others. new sites are needed for this purpose. In the case of open space and education the provision of land is based on the standards set out in Chapter 3, namely, 11.1 acres and 4.9 acres per 1,000 population respectively. For other uses half the standard allowances has been made, namely 3.7 acres per 1,000 population, because it is assumed that displaced population will continue to make some use of existing facilities, particularly in the central areas.

21. In the other towns most of the displaced population should be able to make use of the existing facilities but it is considered that some provision should be made for education, open space, etc, in order to take into account increasing demands for space. Therefore a reduced rate of approximately half of the full land allocation is adopted for the other towns. The total land requirement for Ancillary Land Uses is set out in Table 18.4.

22. It was not necessary for the purposes of the regional survey to make a detailed study of the amount of redevelopment and improvement required in particular services and facilities. However, some indications are given in respect of schools and hospitals in Chapters 19 and 20.

TOTAL LAND REQUIREMENTS FOR THE BASIC PROGRAMME

23. Taking the totals from Tables 18.2–4, the land requirements for displacement in the Tayside Region amount to 6,200 acres. This is a measure of the amount of new land that is likely to be taken for urban expansion even without any population increase taking place. A division of this total among the various parts of the region on the basis of the considerations and assumptions set out in this chapter is shown in Table 18.5. These acreages have been allowed for in the broad zones of development indicated on Map 7.

TABLE 18.5 New Land Required for the Basic Programme, 1971–2001

Area	*Land Required for:—*			
	Housing (acres)	*Industry (acres)*	*Ancillaries (acres)*	*Total (acres)*
Dundee (including Carnoustie, Monifieth, Newport and Tayport)	2,000	700	1,300	4,000
Perth	300	100	200	600
Arbroath	150	100	100	350
Forfar/Kirriemuir	110	40	30	180
St Andrews/Cupar	100	50	30	180
Montrose/Brechin	160	50	50	260
Blairgowrie, Alyth, Coupar Angus	80	20	20	120
Remainder of Tayside	400	40	70	510
Total	3,300	1,100	1,800	6,200

19 Education

1. The future needs for educational facilities in Tayside depend principally upon the size and character of the population and its geographical distribution, together with existing provisions and their potential for improvement and adaptation, and future trends in educational preferences and requirements including government policies.

2. The population projections in Chapter 11 and the phasing possibilities outlined in Chapters 4 and 5, provide guide-lines, so far as population is concerned, to the aggregates of educational facilities that may be required.

3. The areas that could accommodate the existing level of Tayside population and the remit increases are indicated in Chapter 4. Selection of these areas was influenced to some extent by the location and nature of existing educational facilities. One of the objectives has been to encourage the grouping of new residential areas into large enough units to enable a primary school to be provided within about a quarter of a mile of most households.

4. We sought to group these basic population units so as to satisfy certain other criteria including the assumption that a population of 15,000 or so might be expected to justify a secondary school and should be deployed so that about 90% of the children attending the school would live within ten minutes walk from it. Diagram 21 in this chapter indicates broadly the distribution of new secondary schools to serve the proposed new residential areas on this basis. In siting and designing these new schools provision should be made, so far as possible, for their use as district centres for adult education, community entertainment and certain other recreational purposes.

5. The journey-to-school standards suggested cannot apply in all cases. Existing communities and their schools will provide some exceptions and the standards cannot be met in rural areas. A further exception, which lies beyond our consideration, will occur while separate schools are provided for Roman Catholic children. Moreover the basic population units will not always provide just the right numbers of children for two-stream primary schools and for secondary schools.

6. The existing provision for school and advanced education in Tayside, the condition and capacity of existing premises, and current programmes for closures, expansions and rebuilding, are examined below by category of educational establishment.

7. We did not examine the provision of nursery schools. Demand for places in these schools may grow—as suggested for England by the Plowden Report—but the rate of increase in Scotland is not clear. We expect study of this matter to be required at a later date. Neither have we examined the need for special educational facilities—schools for the handicapped, child guidance clinics, and the like. In both cases no considerations of significance for a regional plan seem to emerge.

8. Future trends in specialist technical training and non-vocational, leisure-time education are uncertain beyond the next few years. Changes in the areas and functions of existing local education authorities are similarly unpredictable at this stage.

9. While we discuss schools at some length in the following paragraphs, it is the larger establishments that need special consideration. Further education colleges and universities represent major expenditure and draw students from wide areas. Their siting, size, and order of development are less dependent than are schools on the local characteristics and distribution of population. The capacities and quality of its colleges and universities are important factors, however, in attracting new population and employers into a region.

PRIMARY EDUCATION

10. In the area administered by the four education authorities of Dundee City and Angus, Perth and Fife Counties, there were in 1967 according to Scottish Education Department statistics, 385 separate primary schools and 37 primary departments attached to secondary schools. Within Dundee most of these schools had more than 200 pupils, but in the rural areas there were 162 primary schools with under 50 pupils, including 91 with less than 25. Most schools had five or more teachers and the average size of class ranges from 30 pupils in Perth County to 36 in Dundee, compared with a Scottish average of 35.

11. Many of these schools are in old buildings. In the process of modernisation and replacement small and remote rural schools are being closed, the pupils being transferred to larger schools where modern facilities can be provided more economically. There is, however, a limit to this process, for it is generally considered that young children should not have to travel more than 30 minutes between home and school. On this basis some small schools will have to be maintained in the Highland parts of Tayside.

12. Angus County Council has closed many small rural schools in recent years and is establishing, as far as possible, schools with minimum enrolments of 100 pupils, at focal points in the rural settlement pattern. Perth County is experiencing a rapid fall in enrolment at many rural schools and is closing them when the number of pupils falls below 10. In north-east Fife, where the number of pupils has been more stable, the present

policy is to maintain the existing rural schools for as long as possible.

13. In urban Tayside, primary schools are generally located within fairly easy reach of their pupils. Many of the older primary schools will continue to be required and will have to be modernised or rebuilt. In Dundee 29 of its 48 primary schools have been built since 1945 and two-thirds of the total enrolment is accommodated in these more modern buildings. The newer schools are generally in the new suburbs. The 19 older schools include some old and inadequate buildings. It is hoped that the worst of these older schools might be rebuilt in the 1970s.

14. The size of population required to keep a two-stream primary school with the standard 560 places fully occupied varies substantially over time in accordance with its demographic characteristics. For areas of new residential development in Tayside, we think that a population of 3000–5000 would justify the establishment of a school. We recognise, however, that while it may be reasonable to plan broadly on this basis, where the demand for places is temporarily excessive additional capacity may have to be provided by increasing the size of classes, by obtaining accommodation in temporary classrooms, and, possibly, by arranging that some children travel to school in neighbouring areas where, because of their stage of development, there may be spare primary school capacity.

15. We assume that, in areas that might be developed for the growth of population and new households and for families displaced from older housing districts, there will be a two-stream primary school for every 3,000–5,000 people. A site of 4½ acres would be required for a school of this size, and the gross density figures used in estimating the land needed for new residential development have allowed for this standard of provision.

16. The first phase proposals in this Report envisage an increase of 56,000 in the Tayside population by 1981. In addition a basic programme of improvement may involve the displacement of some 52,000 persons from existing urban areas on to new land. Given the development of new residential areas to accomodate these numbers of persons, a superficial assessment suggests a requirement for 22–36 new primary schools. In fact, making allowances for the nature of the population likely to be occupying the new areas, and some flexibility of arrangements, including the possible use of capacity in existing schools in adjacent areas, the necessary provision seems likely to be nearer the lower end of the range rather than the upper, implying a programme of about two new primary schools a year over and above any that will have to be rebuilt in existing residential areas.

SECONDARY EDUCATION

17. In Dundee, Angus, Perth and Tayside Fife, there were in 1967 fortyfive secondary schools with a total enrolment of about 24,000 pupils. The proportion of pupils remaining at school beyond the statutory leaving age is much the same in Dundee as in Scotland as a whole, but considerably higher in Perth County and somewhat lower in Angus and Fife. This means that the last two areas have the biggest adjustment to make in providing for the raising of the school-leaving age.

18. Assuming that a new secondary school for about 1000–1500 pupils would be required for each increment of about 15,000 to the total population, an increase of 300,000 in population would, in itself, require at least 20 new secondary schools in Tayside by 2001. In the short term, given an increase of 56,000 (distributed as described in Chapter 5) additional schools would be required to the extent of two to three for the Dundee Area, one for Perth and, probably, one for Arbroath, all by 1981.

19. The question of the extent to which existing secondary schools can meet the future needs of the present population and also contribute to growth needs is complicated by the varying age and conditions of the buildings and by the impact of current educational policies on size and location. These matters have been discussed with the Directors of Education and the District Inspectors of the Scottish Education Department, and information has been obtained about existing premises and current building programmes. The general position is that because of the forthcoming raising of the leaving age and the demands on accommodation resulting from the move towards comprehensive education, there is virtually no reserve of secondary school accommodation anywhere in Tayside that could provide for an increase in population.

Angus County

20. In Angus the general aim is to close the old junior secondary schools in the rural areas and accommodate the pupils in larger comprehensive schools in various burghs. The burgh schools are convenient to most parts of the County, and catchment areas are being planned on the basis of a maximum journey of 30 minutes between home and school. Present opinion regards an enrolment of 1,000 to 1,500 pupils as the best size of a typical secondary school for Angus.

21. Existing schools in the burghs are being improved and extended; temporary classrooms are being added to meet urgent needs. Arbroath Academy will have to be extended in the early 1970s and a replacement built for Arbroath High School by 1975, even on existing trends. Forfar Academy and Montrose Academy are under pressure and will have to be extended in the near future. The current programme provides for a new High School at Brechin but the additional accommodation will be virtually filled when the junior secondary schools in the Brechin catchment area are closed. At Carnoustie a programmed new High School may provide a small surplus of places over projected local needs to 1972, but this could be taken up by pupils from Murroes Junior Secondary which is to be closed or rebuilt as soon as possible.

22. The nearest secondary schools to Murroes lie within Dundee but, under present administrative arrangements, children will have to travel a greater distance to Carnoustie, the nearest Angus County secondary school.

Academy and Lawside Academy, both on the west side of the city. There is no spare capacity for external pupils in any of the schools in the northern and eastern suburbs of Dundee.

33. In the 1970s new secondary schools will be required in the outer suburbs of Dundee. Places will also be required to meet the needs of children living in parts of Angus and Perth adjacent to Dundee. And further places will be required for such areas if growth of population is achieved. It would be desirable to site the secondary schools that will be required so that convenience is maximised and costs minimised without regard to existing administrative boundaries.

Fee-paying Schools

34. Outside the Dundee area there is at present some limited provision of places for fee-paying day schooling. In Dundee there are two grant-aided schools and one independent school. The latter and one of the former are very small establishments but the High School of Dundee is a long-established, fee-paying school which has a good reputation in educational circles. The High School is co-educational with 1,200 primary and secondary pupils occupying a distinguished, but now rather old-fashioned building in the centre of the City. This position though convenient for the wide catchment area from which its pupils are drawn, places considerable difficulties in the way of its expansion. There is a high and rising demand for places at this school including applications from newcomers to Tayside but, because of financial and physical limitations, the High School falls some way short of satisfying the demand at current levels of fees. Adequate provision should be made for the expansion of the school in the City's redevelopment plans.

35. A region that was unable to provide the full range of educational opportunity that might be available elsewhere would be at a disadvantage in holding and attracting population. The ability of Tayside, and of Dundee in particular, to provide school places of the kind now available at Dundee High School, and at some other fee-paying schools, is not an unimportant factor in attracting certain employers and employees of significance to the Region's economic development.

FURTHER EDUCATION

36. Tayside contains two central institutions for advanced technical education, both situated in Dundee (Dundee College of Technology and Duncan of Jordanstone College of Art).

37. Dundee College of Technology offers degree level courses in science, engineering and business studies, and a variety of technician and higher technician qualifications in the fields of management, engineering, building, textiles, and commerce. Its 1969/70 enrolment is 550 full-time students, 500 part-time (300 of whom attend in the evenings) and 300 attending ad hoc short course.

38. The College is building on sites immediately adjacent to its existing accommodation in the centre of Dundee. All its new buildings are expected to be ready in 1973, and the College will then be able to accommodate a full-time student population of some 1,500 together with 1,000 or so part-time students attending on average once a week. It is anticipated that the College will experience a growth in demand for its degree level courses as the C.N.A.A. system expands. In the process it may reduce its teaching for technician qualifications. We have been told that the College may be short of accommodation by the 1980s. Further expansion in its existing location would be difficult.

39. The Duncan of Jordanstone College of Art at present (1969) has 540 full-time students, together with nearly 100 day-release students, and about 900 part-time students doing non-vocational work. The College offers the usual courses in arts and crafts and has schools of architecture and of town and regional planning; it provides training for health visitors; and it hopes to institute a school of home economics and institutional management. The College has close contacts with the Dundee College of Technology. It is situated beside Dundee University and hopes to make some joint degree arrangement with the University.

40. The College's present intake of students is constrained by lack of space; but a new building on an adjacent site should enable full-time student numbers to rise to 1,000 in 1976, with the main growth being in architecture, planning, and home economics. Further building on the existing site could take the number of full-time students up to 1,500. The number of day-release students is likely to diminish. It seems that the College will be able to meet probable demands at least well into the 1980s.

41. Courses at lower technician and craft level are provided in Dundee at Kingsway Technical College and Dundee College of Commerce; in Arbroath at the Angus Technical College; in Perth at the Technical College, and in Tayside Fife at Elmwood Agricultural and Technical College, Cupar. Kirkcaldy Technical College and Glenrothes Technical College, although they lie outside Tayside, also have potential importance as further education centres for parts of Tayside.

42. Certain general trends in technical education may influence all the colleges listed in paragraph 41. Considerable growth can be expected in the already large numbers of students on day-release in many cases. In so far as the central institutions for advanced technical education move towards degree courses, the technical colleges may have to provide teaching at higher technician level and may themselves wish to see their less academic students taught elsewhere. We see possible risks in this process of change and hope that the responsible authorities will take care to ensure, especially in transition periods, that the requirements of industry and students from industry are adequately met.

43. The Dundee College of Commerce offers junior and intermediate level courses in secretarial and commercial subjects, in retail distribution, and for the qualifications of a number of professional institutions. At Kingsway Technical College, qualifications in engineering, building, science, catering and hotel-keeping, horticulture, and hairdressing, are offered. A

limited range of courses in engineering with some building and agriculture is offered at Arbroath, while at Perth courses are available in engineering, building, agriculture, and secreterial and business subjects.

44. In Fife, craft and technician courses in engineering, building, science, mining, and catering and hotel-keeping are available at Kirkcaldy Technical College together with comparable levels of work in secretarial and business studies, including courses for computer personnel. At Glenrothes, craft level work is done in engineering subjects, building, papermaking, supervisory studies, and secretarial and office studies. At Cupar a wide range of agricultural subjects is offered together with a limited range of commercial and engineering studies at craft level. In Perthshire there is also a limited provision of agricultural courses at Lawers School of Agriculture, Comrie.

45. The accommodation available at Kingsway Technical College, Dundee College of Commerce, Elmwood Agricultural and Technical College, Kirkcaldy Technical College and Perth Technical College is very fully used but there is some spare capacity at Angus and Glenrothes Technical Colleges.

46. At Angus Technical College, extension will begin in 1970/71 to provide a full-time equivalent student capacity of 1,265. Construction of a new building for Elmwood College is due to start in 1969/70 and will raise the full-time equivalent student capacity to 900. The new Perth Technical College (1,150) was started in 1969. A new college of further education (1,000) in Dundee, to relieve the pressure on Kingsway Technical College and Dundee College of Commerce, is proposed.

47. The only college of education in Tayside is the Dundee College of Education which has traditionally catered for most of the teacher training requirements of an area a little larger than Tayside—broadly the counties of Angus, Fife, Kinross, Clackmannan and Perth—but it is now increasingly drawing students from and providing teachers for a wider area. At present the College provides courses leading to the usual qualifications in infant, primary, and secondary education, to qualifications in music and technical subjects, and (in conjunction with Dundee University) to the Degree of Bachelor of Education. It also offers in-service training courses, used mainly by teachers in Tayside.

48. The present (1969) enrolment in the College of Education is 1,150. In 1973 it will move to new buildings with capacity for 1,700 students and a further 100—150 teachers on in-service training. It is expected that initially there will be some spare capacity in the new buildings but there is only limited room for further expansion. The principal constraint on College growth in the 1970s is likely to be a difficulty in placing students in schools for teaching practice. However growth of Tayside population affects both the demand for teachers and the supply of places for students: the supply of places should increase as Tayside population grows. Expansion of the College beyond a population of 1,700 or so students is heavily dependent on influences external to Tayside, such as Government policies and educational trends in Scotland. For these reasons, it is not appropriate to estimate requirements and growth in this field too far ahead. It seems, however, that the College can meet, at least up to the 1980s, any demands likely to be made on it as a result of possible population increases.

49. This account of existing centres shows that Tayside has a good range of further education facilities well located in relation to the existing population and to potential expansion areas. The training provided by these centres for industry and commerce is of substantial importance for the development of the region. It is one of its assets that Tayside already has a number of centres, strategically placed, that will provide a good base for expansion in this area of educational activity.

UNIVERSITY EDUCATION

50. The Universities of St Andrews and Dundee are prominent among the conditions favouring growth of employment and population in Tayside. Both Universities expect to expand greatly in size in the next decade or so, with the number of university places available in the Region increasing from 5,000 in 1969 to at least 10,000 in the 1990s. Expanding universities generate direct and indirect increases in employment and this factor, while far from negligible in the City of Dundee, is of great importance for the town of St Andrews. Both Universities have already established useful and strengthening links with industry within and outside the Region, and there should be no difficulty in expanding consultancy and other services for industries developing in the area.

51. The present student population of the University of St Andrews is 2,400 (1969). Its estimated population for 1981 is 4,000, which is, at present, seen by the University as its desirable maximum size. The current population is divided roughly equally between divinity and arts (including social sciences) on the one hand, and sciences on the other; this pattern is intended to persist in the expanding University. St Andrews University does not expect to need more land for expansion to 4,000 than it already has available.

52. The University of Dundee has a student population of more than 2,400 (1969). Its estimated population for 1981 is 4,100 with a target of 6,000 by the end of the century, but reappraisal may raise the 1981 target to at least 5,000 and a population of 8,000 by the end of the century is a possibility. The present population consists of about 1,000 in social science, letters and law, 950 in science and engineering, and the rest in medicine and dentistry. The proportionate distribution in 1981 is expected to be much the same as in 1969. Land for development to a population of 4,000 or so is available; it is hoped to acquire adjacent sites of more than 20 acres, and this, together with the existing precinct of about 60 acres, should be sufficient to allow the University to grow to a population of at least 8,000. Some further sites, for residences and recreation, will be required.

53. Each of the Universities employs 1100—1200

people, including part-time employees. The expansions projected up to 1981 will increase direct employment (in terms of full-time equivalents) possibly by as much as 700 in St Andrews and by 700/1200 in Dundee. Expansion also has indirect effects on employment which are likely to increase the employment engendered well above the figures of direct jobs for each centre.

54. It would be of significant benefit to the Region if both Universities grew as fast and as far as indicated by their present policies; we think that the benefit could be materially and desirably increased if policies of more rapid and/or greater expansion could be adopted. We recommend that land for the expansions proposed, and for such greater expansions as may be feasible, should be made available in St Andrews and Dundee. We note, however, that many of the critical factors determining the expansion of the Universities lie outside Tayside. In particular, the estimates of future populations are based on the assumption that universities will not be restricted in the period considered, to entrants from their own catchment areas.

CONCLUDING REMARKS

55. Diagram 21 shows Tayside's existing major educational facilities. The hub of the Region's educational services is Dundee, with Perth and Arbroath, serving as sub-regional centres. For Tayside Fife provision is more dispersed at St Andrews and Cupar and, outside the region, at Glenrothes, Kirkcaldy and Buckhaven.

56. Diagram 21 shows the old rural, junior secondary schools which the education authorities are proposing to close as soon as accommodation can be provided elsewhere. It also indicates the broad distribution of the new secondary schools that would be required if the population were to increase by 300,000.

57. Assuming that a new secondary school for about 1000–1500 pupils would be required for each increment of 15,000 to the total population, the upper remit proposal of an increase of 300,000 means that at least 20 new secondary schools would be required in Tayside by 2001 (Diagram 21 shows in fact 24 because certain areas do not divide easily into 15,000 person catchment areas). The numbers of new primary schools required would be four or so times the number of secondary schools. In addition to the increases required to meet the needs of increasing population, there would be also a substantial programme of replacement and modernisation of existing schools.

58. Further studies to determine needs in respect of further education and special schools will be required as development takes place.

59. It is in general, desirable that schools and colleges should be regarded as community centres, and that they should be designed, sited and administered so as to facilitate public use of the premises and the sharing of specialist facilities.

60. Despite the considerable amount of new school-building in Tayside in recent years there is no significant amount of accommodation in reserve to meet needs beyond 1972. Closures policies should be reviewed in the light of this Report and potential educational needs.

20 Health Services

1. In this Chapter we summarise the information we have collected about the existing health services in the region and the current trends and commitments. From the fore-casts and phasing proposals in other chapters of the Report the responsible authorities can calculate what the future needs might be in relation to the growth possibilities, and we present here, therefore, only a broad outline of the main implications for the hospital service, local health services and welfare services, taking into account the possible growth and geographical distribution of population in Tayside.

HOSPITAL SERVICES

2. Responsibility for hospital services in Tayside is divided between the Eastern Regional Hospital Board and the South-Eastern Regional Hospital Board; the former is responsible for Dundee, Angus and Perthshire (and also Kinross) and the latter for the Fifeshire part of the Region. Parts of the north of Fife can be most conveniently served from hospitals in the adjoining counties, and arrangements with respect to acute hospital services have been made between the Boards whereby about 11,000 people in the Tayport-Newport area rely on Dundee, and about 15,000 people in north-west Fife on Bridge of Earn. In all other medical respects provision is at present made for these 26,000 people at hospitals within Fife. In addition, the Eastern Regional Board provides services in Angus for some 10,000 people from south Kincardinshire; on the other hand a similar number of people in west Perthshire looks to Stirling in the Western Region for most of its hospital services.

3. The administrative pattern which separates the north of Fife from the rest of Tayside is similar to the existing structure of local government. There is a general tendency, however, for the people living in this part of the County to look to Dundee and Perth for many services, and some revisions of the administrative arrangements for hospital services may well be desirable in the light of the growth possibilities considered in this Report.

4. Diagram 22 shows the principal hospitals in Tayside as listed in the *Hospital Year Book* for 1969. The general Scottish policy is to rebuild the principal teaching hospitals as a matter of priority and to create throughout the country a network of district general hospitals to provide the main consultant services for both in-patients and out-patients, each hospital generally serving a population of about 200,000. These district general hospitals will replace some of the existing small cottage hospitals, though some of the latter may continue in use for geriatric services while others may become district health centres.

5. In 1963 the Eastern Regional Hospital Board published a long-term plan for the development and re-organisation of hospital and specialist services on the assumption of a very small increase in population in its region. In three tables the Board set out its intentions for the building, closure and re-organisation of hospitals in its three sub-regions – the Dundee area, the Perth area, and the Angus area. In the following paragraphs we reproduce summary versions of these tables, adjusted to take account of subsequent decisions by the Regional Board, and we show the further provision that would seem to be implied by the growth possibilities considered in this Study.

6. Diagram 22 shows the broad locations of the various hospitals which the Regional Board proposed to retain, and summarises the additional accommodation which might ultimately be required if the growth possibilities are achieved. The method of presenting information about additional requirements in the following tables (and on the diagram) is not intended to imply that the additional accommodation that may be required must always be provided within the areas to which the tables relate. Given the total size of the Region, some types of service may have to be provided in one area for the whole Region, as is the case at present for communicable diseases and mental deficiency; and the particular location of populations may make it desirable to provide hospital services for part of one area from an adjacent area, or even from an adjacent hospital board region. In general, however, the additional provisions estimated in the Tables 1–3, if taken together, give a reasonable indication of the broad effect on the hospital services, as at present planned, if the maximum developments envisaged in this Study come into existence.

7. With the assistance of the Eastern Regional Hospital Board and the Scottish Home and Health Department, we have adopted the following bed ratios as the basis for calculating possible additional requirements for the three Eastern Board Areas.

Acute = 3.5 beds per 1,000 population in Dundee area
2.5 beds per 1,000 population elsewhere
Maternity = 0.69 beds per 1,000 population
Geriatric = 2.0 beds per 1,000 population
Mental Illness = 2.5 beds per 1,000 population
Mental Deficiency = 1.5 beds per 1,000 population
Communicable Diseases = 4.0 beds per 10,000 population

Dundee Area

8. Table 20.1 below shows the Hospital Board's long-term proposals for its Dundee area. Within this area there are two hospitals which are intended to serve the whole Region – King's Cross for communicable diseases and Strathmartine for mental deficiency – and similarly some of the narrower specialities meet the needs of the Region as a whole from the acute hospitals in Dundee. The key

TABLE 20.1 **Proposals for Hospital Services in Dundee Area[1] and Projected Further Needs**

Hospital	*Acute*	*Maternity*	*Geriatric*	*Mental*	*M.D.*	*Communicable*
	Number of Beds					
Ninewells	604	136	—	31	—	—
2nd Teaching Hospital (DRI temporarily)	372	—	58	—	—	—
Ashludie	—		170	—	—	—
Royal Victoria	—	—	205	—	—	—
King's Cross	—	—	—	—	—	210[2]
Liff	—	—	—	626	—	—
Strathmartine (including Armitstead)	—	—	—	—	765[2]	—
Total planned provision	976	136	433	657	765[2]	210[2]
Population served	233,000	231,000	209,000	206,000	403,000	403,000
Additional beds for +110,000 in Dundee Expansion Area[3]	225	100	205	133	250[2]	60[2]

Notes (1) Supplied by Eastern Regional Hospital Board. The Board's Dundee area is smaller than this Study's Dundee Expansion Area and excludes, in particular, the potential development areas South of the Tay.

(2) To cover service to the whole of the Board's region and that part of the Dundee Expansion Area lying South of the Tay Population in these areas is assumed to increase by 273,000

(3) The Dundee Expansion Area is defined in Chapter 24. The projected needs do not cover the further growth of some 25,000 allocated to parts of Tayside Fife outside the Newport—Tayport area.

feature of the Board's proposals is the decision to build two large teaching hospitals in Dundee. The first of these, at Ninewells, is expected to come into use in 1972, and it will be well placed to serve also as a local hospital for any development to the west and north-west of the City. The site of the second teaching hospital has not yet been settled.

9. The effects on the planning of hospital services in the Board's Dundee area of the increase in population indicated in the last line of Table 20.1 are complex. Moreover there are other population factors to be taken into account. First, there will be some 56,000 or so people displaced from existing urban areas, principally from Dundee, within the Dundee Expansion Area. The possible location and relocation of new and displaced population is discussed and illustrated in Chapter 24 (The Dundee Area). Of this total of 166,000 some 40,000 may be located south of the Tay within the region at present administered by the South-Eastern Hospital Board. Secondly, we propose substantial development to the east of Dundee including developments in the general areas of Monifieth and Carnoustie. The present planning framework of the Eastern Board places some of these proposed developments in its Angus Area. Thirdly, an increase of rather more than 25,000 in population is possible in Tayside Fife, outside the Dundee Expansion Area, in such places as Cupar, St Andrews and the East Neuk. This expansion of 25,000 would be in the region at present administered by the South-Eastern Board. In this area there are small cottage and maternity hospitals in Cupar and St Andrews of which account will have to be taken in planning additional facilities.

10. It seems to us to be inconsistent with the reality of the Tayside Region, and of the concept of a regional city, to have administrative boundaries in the health service that would divide our Dundee Expansion Area in particular, and possibly the Tayside Region, between two separate authorities. This is so if population is to move as freely to Dundee (and also Perth) for hospital and other services as we think is desirable. Thus we consider hospital provision for population in the Dundee Expansion Area on the assumption that arrangements will be made by the Eastern Regional Board.

11. If the population in the Dundee Expansion Area increases by 110,000, the estimated additional provision that would appear to be necessary may be sufficient to justify, in time, the creation of a further sizeable hospital in addition to what is currently proposed. Given the proposed distribution of that population, and of population displaced from Dundee, and given that Ninewells will serve the western expansion areas, it is to the east and south of Dundee that the main deficiences in hospital provision are likely to arise. In the current proposals, the only hospital on the east side of the Dundee area is Ashludie at Monifieth, and this is being developed primarily as a geriatric unit. Account must also be taken, so far as the eastern expansion areas are concerned, of the location of the proposed district general hospital in the Board's Angus area (cf paragraph 16). South of the Tay, the small hospitals in Cupar and St Andrews will have to be taken into account in planning additional facilities. It is clearly necessary that, given acceptance of our suggestions as to the areas where population growth might take place, the responsible authorities should determine the size and siting of the second teaching hospital and the capacity for additional requirements taking full consideration of these suggestions.

Perth Area

12. Table 20.2 sets out the proposals which the Eastern Regional Board formulated in 1963 for the long-term pattern of hospital services in the western parts of Tayside. The general aim, as elsewhere in its region, was to provide for the eventual closure of some of

TABLE 20.2 Proposals for Hospital Services in the Perth Area(1) and Projected Further Needs

Hospital	*Number of Beds* *Acute*	 *Maternity*	 *Geriatric*	 *Mental*
New District Hospital	340	78	52	20
Perth Royal Infirmary	–	–	124	–
Aberfeldy	X	5	10	–
Blairgowrie	X	8	24	–
Crieff	X	–	16	–
Pitlochry	X	–	12	–
Auchterarder	X	–	12	–
Murray Royal	–	–	–	550
Total planned provision	340	91	250	570
Population served(2)	125,000	115,000	115,000	115,000
Additional beds for +83,000 in Perth and Perthshire(2)	180	45	145	–

Notes (1) Supplied by Eastern Regional Hospital Board.

(2) The population served includes about 15,000 people in north-west Fife who look to Bridge of Earn for acute hospital services. Our estimates for additional beds relate to all additional population in Tayside Perth excluding the Dundee Expansion Area.

X represents an undetermined number of general practitioner beds.

the older rural cottage hospitals and for a centralisation of services in a new district general hospital in Perth. However, because of the size of Perthshire and the comparatively dispersed distribution of the population it was felt to be necessary to retain most of the cottage hospitals, and in fact to expand and improve their specialist services for the less mobile patients, especially in regard to geriatrics and, to some extent, maternity cases. Thus Diagram 22 shows hospitals in most of the principal towns in Perthshire. In the case of mental illness, provision was made for the ultimate closure of Murthly Hospital and the development of Murray Royal Hospital as the central psychiatric hospital for the area.

13. The major proposal is for the building of the new district general hospital in Perth on a site adjoining the existing Royal Infirmary, the latter becoming the main centre for geriatric services after its acute functions are transferred to the new premises. As matters now stand it is clear that the new hospital will not be built before the 1980s. Meanwhile various improvements are being made to the Royal Infirmary, including the building of a new 78-bed maternity department. When the new hospital is completed, the Board intend to close the hospitals at Hillside and Burghmuir, and Bridge of Earn Hospital will also become surplus to requirements.

14. In relation to the regional planning proposals this centralisation of major district and psychiatric hospital services on Perth does not seem to have any serious drawbacks, given the intention of maintaining a number of cottage hospitals in the principal area centres. Table 20.2 sets out the further needs which might have to be met in Perth and Tayside Perthshire if Tayside's population increases by +300,000 by the end of the century. The Board will have to consider whether the additional requirements strengthen the case for a new district hospital, although on a larger scale, or point to the need for a second new hospital. Given that district general hospitals will generally serve a population of up to 200,000 people, it seems unlikely that a second hospital could be justified unless there are special circumstances.

Angus Area

15. The Eastern Regional Board has accepted the need for a new district general hospital to provide comprehensive medical services for the people of Angus. In reaching this decision the Board is aiming to reduce the dependence of this Area on the specialist services in Dundee and to provide modern hospital facilities at some convenient site within easy reach of Carnoustie, Arbroath, Montrose, Brechin and Forfar, and their adjoining rural areas. This long-standing 'commitment' was confirmed by the Board in its 1963 review, but at that time it was not able to decide precisely where or when the new hospital would be built. In the meantime plans were made for various improvements at Stracathro Hospital (north of Brechin) to enable it to serve as the district hospital for Angus until the new hospital is built. On current programming Stracathro is likely to continue to function in this capacity until the 1990s.

16. The Board's proposals which are summarised in Table 20.3 show the intended long-term results of this policy. Stracathro would ultimately be closed, and the existing general infirmaries in Arbroath, Forfar, Montrose and Brechin would provide mainly geriatric services, but with general practitioner units providing non-specialist treatment for the local catchment areas. The intention is that these local hospitals would be closely associated with the district general hospital. The siting of the latter requires, therefore, careful consideration, for it has to be placed where it can both function as the hub of the hospital system and also serve conveniently the greater part of the population.

17. On the basis of its projections the Board narrowed the choice of location down to Arbroath or Brechin. Many factors may affect the choice between these two places by the time the new hospital can be built, and further places may possibly come into the range of considerations. If it continues to be, as indicated earlier, hospital service policy that district hospitals should serve a population of about 200,000, then, even with the development proposals in this Study, Angus can have

TABLE 20.3 Proposals for Hospital Services in the Angus Area(1) and Projected Further Needs

Hospital	*Number of beds* *Acute*	*Maternity*	*Geriatric*	*Mental*
New District Hospital (temporarily Strecathro)	245	40	56	–
Arbroath Infirmary	X	15	45	–
Brechin Infirmary	X	–	20	–
Montrose Infirmary	X	–	25	–
Forfar (Fyfe Jamieson)	–	15	–	–
Forfar (Whitehills)	X	–	35	–
Sunnyside (Montrose)	–	–	–	600
Total planned provision	245	70	181	600
Population served(2)	81,000	67,000	89,000	92,000
Additional beds for +80,000 population in Angus(2)	155	30	155	–

Notes (1) Supplied by Eastern Regional Hospital Board.

(2) The population served includes some 10,000 people from South Kincardineshire. Our estimates for additional beds relate to all additional population in Angus excluding the Dundee Expansion Area. Our Dundee Expansion Area includes parts of the Regional Board's Angus area, e.g. Carnoustie.

X represents an undetermined number of general practitioner beds.

only one such hospital. The effect of these proposals would be to increase the proportion of the Angus population in the Arbroath/Carnoustie areas, and Arbroath might therefore become the preferable location for the new district hospital. Other factors will, however, have to be taken into account by the Board. A decision, for example, to build a new acute hospital to the north-east of the Dundee area would be a factor influencing the choice of location for the Angus hospital.

LOCAL HEALTH SERVICES

18. The Scottish Home and Health Department and the Hospital Boards are promoting the idea of closer liaison between the hospital service, the general practitioners and the local authority health services. To this end they are encouraging the establishment of a network of local health centres which would house the main local authority clinics, the consulting rooms for a number of doctors and dentists, and certain specialist and diagnostic services. In the view of the Boards, many of the small cottage hospitals in Tayside should become increasingly concerned with these functions, and as the new pattern of district hospital services becomes established, close links should be formed between them and the local centres within their catchment area.

19. Tables 20.2 and 20.3 in the previous section on the hospital service show the nine cottage hospitals in Angus and Perthshire in which the Eastern board proposed to provide GP beds for general purposes, and the locations of these hospitals and of comparable establishments in the Fifeshire part of Tayside are shown in Diagram 22. Most of the Tayside burghs have at least a cottage hospital and, therefore, a focal point for their local health services; the places which are lacking in this respect are Carnoustie, Kirriemuir, Alyth, Coupar Angus, Dunkeld, Newburgh and the towns in the East Neuk area. Whether the cottage hospitals should themselves become the health centres for the areas in which they are located brings in questions of detailed siting and of the age and condition of buildings which lie beyond the scope of a regional planning study.

20. It is perhaps worth adding that the scale of the change in the Local Health Services implied by a growth target of +300,000 population by the year 2001 should facilitate the development of a network of local health centres. There would, for example, be about 200 doctors and dentists required to meet the needs of the additional population and to be found accommodation outside the hospitals in Tayside.

SOCIAL WORK SERVICES

21. Under the terms of the Social Work Services Act each Local Authority is setting up a Social Work Department with responsibility for promoting social welfare. The staff will be concerned with meeting a wide range of social needs including provision for the handicapped, mentally ill, elderly and Court cases. Generally, these departments will be organised on a neighbourhood basis, and early consultations should, therefore, be arranged when the development of new areas is being planned.

22. The scope of the Social Work Departments' responsibilities will involve them in social planning in a wider sense. Chapter 12 (Sociological Background) points out some of the characteristics and preferences which are found in areas of population growth, and these need to be foreseen and so far as possible allowed for. The Social Work Department could possibly be involved in the monitoring of developments to provide improved guide-lines for subsequent stages, and in social development work to promote community activities in the new areas.

23. It is not within the scope of this regional study to consider the siting of social welfare offices, but there would appear to be potential benefits in terms of co-ordinating planning at the community level if the social work teams were based on the cottage hospitals and local health centres.

21 Engineering Services

1. We have estimated that capital expenditure on engineering services in Tayside (water, sewerage, electricity, gas) over the years to 2001 will amount to about 5–6% of the total capital outlays likely to be required. This proportion applies with no population increase and with an increase of as much as 300,000. It follows that appreciable variations in these costs would have little impact on the total costs of expansion. For this reason, and because of the difficulties of being precise over a 30-year period, this chapter makes only broad appraisals of the problems of providing engineering services to the areas selected as being most suitable for expending industry and population.

WATER

2. The East of Scotland Water Board is responsible for supplying water to most of Tayside; its area includes South Kincardineshire, Perthshire, Dundee and Angus, but only part of Tayside Fife.

3. The present demand in the Region is about 31 million gallons per day. Approximately 65% of this is for domestic purposes and 35% is required for industry. The existing and potential sources of supplies are shown in Table 21.1 and on Diagram 23. The characteristics of each area are summarised in (a) to (h) below.

(a) *Loch Lee.* An upland catchment that supplies the general area of Angus and South Kincardine (including Stonehaven). The existing yield is 2.0 million gallons per day (mgd) with present consumption at 0.94 mgd. Extensions of the works will raise the yield to 3.4 mgd. If sufficient storage could be provided, a yield of the order of 25 mgd may be achieved. This large potential capacity is at a greater distance than (c) below from the Dundee Expansion Area and, therefore, is not used extensively in the proposals for development.

(b) *North Esk.* An intake upstream of Montrose provides the bulk of the supply to the town. The quality of the filtrate has been brought up to modern standards and it is likely that the Water Board will retain and develop this intake.

(c) *Lintrathen.* An upland catchment source that supplies Dundee City, Newport and Tayport. The existing yield is 22.0 mgd and present consumption 14mgd. This source can be developed in stages to give approximate increases of 6mgd., 12mgd., and 15mgd, making a total yield of about 55mgd.

(d) *Tay.* An intake upstream of Perth has an installed capacity of 4.5 mgd and at present throughput of 3mgd. The existing works can be extended to yield 6mgd. The minimum flow past Perth is over 350 mgd and this is a major source that might be developed.

(e) *Loch Turret.* An upland catchment area from which the East of Scotland Water Board have en entitlement of 3.15 mgd. against a present consumption from this source of 0.5 mgd. A scheme in progress will raise the Board's entitlement to 4.75 mgd.

(f) *Glendevon, Glenfarg, Glen Quey.* These are upland catchment sources that supply Fife County. The existing supply is 15.5 mgd and present consumption is 13 mgd. The larger burghs with independent sources are not supplied. A further 11 mgd could be developed from known sources but we would expect this new capacity to be used for a wider area than the Study area.

(g) *Other possible sources* are

- (i) the Knaik-Glenartney area which could yield 83 mgd, and
- (ii) the Glenalmond, Glen Quaich, Glen Fender and Glen Cochill area which could yield 64 mgd.

The development of these sources would be of interest to areas outside Tayside.

(h) A number of *minor sources* supply parts of the Region. At present they have an aggregate yield of 1.6 mgd with consumption at a comparable level. A number of these may be closed as the East of Scotland Board reorganises end develops supplies.

4. Water usage, for domestic end industrial purposes combined, is running at present at 71 gallons per day (gpd) per person. It is estimated that demand per person will rise to 90 gpd by 2001, consisting of 50 gpd domestic and 40 gpd metered (mainly industial). These estimates make no allowance for eny exceptional industrial demands arising from new major water users.

5. Estimates of the aggregate demand for water in 2001, again excluding new exceptional industrial demands, have been made for different sizes of population. Assuming that the 1966 level of population persists, aggregate demand will be about 40 mgd; with a population increase of 175,000, demand will be about 58 mgd; and with an increase of 300,000 people demand would rise from the present 30 mgd or so to about 70 mgd. These very rough figures, in the light of the data of Table 21.1 make it clear that Tayside can supply, admittedly at a cost, all the water likely to be required by a population of 750,000 in 2001. There is obviously wide scope also for meeting some exceptional industrial demands even though some of Tayside's potential supply has to be exported to other areas.

6. We have looked at supply in the light of the short-term and long-term patterns of population growth outlined in Chapter 4 and 5. It is evident that the potential sources of supply can be developed with sufficient flexibility to accord with the demands likely to arise from the possible patterns of growth that may emerge.

7. Developments to meet the demand from a population of 750,000 might run as follows.

(a) *Lintrathen.* After 1981, it will be necessary to increase the yield to supply by some 16 mgd before 2001. This can be achieved in two stages, by commissioning development at (i) Muckle-Newton burns (6mgd) and (ii) the Isla intake (12mgd). This would increase Lintrathen's yield to supply to 40 mgd, and would raise the yield to supply in the Region, even without any other water developments, to about 68 mgd, the amount estimated to be required for a population of 750,000 in 2001.

(b) Some development at *Loch Lee* may be required after 1981 but it is difficult to determine the timing of this since factors operative outside the Region might be critical.

(c) Problems already exist in North and East Fife and a regional distribution system may be required even without any population increase.

8. Lintrathen, which would supply some 40 mgd of the projected demand, is well suited to service Perth, Dundee, Arbroath, Montrose, and population in North Fife using the water link across the Road Bridge. The capital costs of additional headworks and treatment works associated with the Lintrathen developments in paragraph 7(a) are estimated at £2.2 million. This outlay would not be required before the mid-1980s. In the event of additional demand in the long-term, further headworks costing perhaps £2.5 million are possible. It should be emphasised that these estimates are very approximate, and that decisions as to timing and the sources to be developed must be made in the light of actual developments and detailed analysis by the Water Boards.

9. A possible trunk main system has been considered and indicative costs calculated. Assuming a consumption of 90 gpd per head, trunk mains systems for the different patterns of long-term development considered by us would cost about £5 million. From the point of view of a water engineer, the preferred long-term pattern of development would be the one that permitted the most definite phasing by restricting the number of concurrent developments, thereby permitting the greatest deferment of capital outlay and the greatest economy in costs.

10. For an increase in population of 300,000, service mains will cost about £3 million (at £10 per head). Service reservoirs will be required to provide storage of about one day's consumption, *ie* an additional 27 million gallons at a total cost of £1.6 million. These service reservoirs, each of which will cost between £100,000 and £200,000, are likely to be distributed throughout the area and can be provided as consumption increases.

11. Our analysis indicates that no significant capital expenditure on water supply would be caused directly if Tayside population were to increase, in accordance with our first phase suggestions, by about 56,000 by 1981; current consumption is well below the yield to supply. There would, however, be expansion costs in the long run. The total capital cost (at 1968 prices) of the water developments required comfortably to serve a Tayside population of 750,000 are estimated, very roughly, at about £14 million. This includes some money that will have to be spent, in any event, to meet the requirements of a population that remained at the 1966 level. No attempt has been made to estimate running costs; they are likely to be at more or less the same level no matter where population is located. It seems probable however that, so far as water is concerned the net capital cost of a population increase of 300,000 is likely to be as low in Tayside as anywhere else in the country, and probably appreciably lower than in many other areas of potential development.

SEWERAGE AND SEWAGE DISPOSAL

12. Most of Tayside lies within the boundaries of the Tay River Purification Board, though parts are administered for river purification purpose by Angus County and Arbroath Town Council. The Board is not the executive authority for sewerage and sewage disposal but is concerned to ensure that existing and proposed discharges do not place on receiving waters pollution loads beyond their capacity.

13. Much of Tayside's population lives in settlements on the coast and on the Tay estuary and sewage is usually discharged untreated to the sea. Perth, which currently discharges untreated sewage to the Tay is building a full treatment works at Sleepless Inch. The

TABLE 21.1 Principal Sources of Water Supplies in Tayside (1969)

Source	*Type*	*General area supplied*	*Existing yield to supply (mgd)*	*Present consumption (mgd)*	*Capacity yield (mgd)*
LOCH LEE	Upland cathchment	Angus and S Kincardine	2.0	0.94	25.0
NORTH ESK	River intake	Montrose Town	1.27	1.27	N.A.
LINTRATHEN	Upland catchment	Dundee City Newport and Tayport	22.0	14.02	55.0
TAY	River intake	Perth City	4.5	3.0	N.A.
LOCH TURRET (ESWB share)	Upland catchment	Perth County and others	3.15	0.5	4.75
GLENOEVON	Upland catchment	Fife County	15.5	13.0	26.5
GLEN FARG					
GLEN OUEY					
MINOR SOURCES			1.6	Negligible	Negligible
TOTAL			50	31	Possibly 340 mgd.

major problems of the Dundee area are discussed later in this section. Towns and villages in the inland parts of Fife, Angus and Perthshire are generally provided with sewers and disposal works. Treatment varies from septic tank to settlement followed by biological filtration, and effluents generally reach adequate standards.

14. On the coast and in the Tay estuary, minimum treatment will be required, possibly comprising settlement and constant discharge of settled liquor with disposal of sludge by controlled discharge. For upstream estuarial development a less stringent quality effluent will probably be deemed sufficient, in view of the dilution available, than will be required at inland locations. Throughout the area, even in coastal developments, it is likely that the partial system of sewerage will be adopted except where pumping is involved, when a fully separate system may be required.

15. Even given existing population trends, capital expenditure on disposal will be required in the next 30 years. The magnitude of this expenditure is related to the nature of the treatment and the extent of work necessary. The Perth development, as currently proposed, is estimated to cost £1.8 million to service a population of up to 53,000, *ie* an increase of about 10,000 with associated industry. Treatment for the Dundee area is expected to cost £5 million to service the existing populations of Dundee and Monifieth. The establishment of works for all other burghs which are not adequately serviced is estimated to cost a further £5 million or so Thus the total expenditure required to improve the existing system appears to be around £12 million at 1988 prices.

16. Dundee and Monifieth have a foreshore of some nine miles along the north bank of the Tay. The sewerage system is a combined one apart from extensions in recent years which are based on the separate system. Two watercourses have been utilised as the network has developed. To the west, the Lochee Burn enters the Tay at Invergowrie and is used for a predominantly industrial area, while to the east the Dighty Water serves a predominantly residential area and discharges to the estuary at Monifieth.

17. Sewage from Dundee is discharged through numerous outfalls, and because of the large volume of water no really serious pollution problems have arisen so far. Improvement in the quality of effluent discharged is expected to be required in time, and any substantial increase in the population of this part of the Region will make this all the more necessary.

18. One possible scheme of improvement would be for a trunk sewer to be laid along the foreshore to pick up the existing and new outfalls and convey effluent to two treatment works. As there are some 36 major outfalls in the 36"—48" diameter size and many smaller ones, this would be a major engineering project estimated to cost about £5 million. The provision of further works to service additional population would not involve engineering activity on this scale. Treatment would probably comprise screening, grit removal and settlement with constant discharge of liquor and disposal of sludge.

19. The disposal of the sludge is one of the major problems to be solved; it could be dumped in deep water by boat or pumped to a coastal outfall (the outfall being underground and extended far enough into deep water to ensure no contamination of beaches or other amenities) or it might be composted with refuse. Other drainage authorities, particularly some inland authorities, might wish to join in projects of this kind.

20. The existing system of trunk sewers serving the Dundee area has virtually no spare capacity which could provide for any increase in the population and, to meet foreseeable needs, supplementary sewers will have to be laid shortly. The most urgent need is in the Dighty Valley area on the north east side of the City. A second trunk sewer will be required ultimately and it could be built with sufficient capacity to serve any development that might be proposed for the Monifieth area. The outlet of the Dighty water at Monifieth would be a suitable site for treatment plant. On the west side of Dundee the existing main outfall at Invergowrie is already overloaded. The potential development areas on this side of the city could probably be drained economically to a treatment plant at Invergowrie.

21. It is estimated that about 90% of the sewage from the existing Dundee area could be drained by gravity to outfalls at Monifieth, Invergowrie and the Harbour Area. The remainder could either be pumped to treatment plant at these places or discharged untreated to the estuary where the dilution volume would probably be great enough to handle this reduced quantity of effluent. Expansion east or west of Dundee would raise no serious difficulties as regards sewage disposal given partial treatment facilities. But major expansion north of the city would ultimately involve crossing the Dighty Water and a major new disposal system would be required involving either building an inland treatment plant producing a high standard of effluent or laying a trunk sewer to the sea along the line of the Fithie burn.

22. The capital cost of providing sewerage services varies depending on the location of population and the degree of treatment required. Generally, the capital costs of treatment works vary from £10 to £50 a head. The fact that the proposed population distributions would place much of the total population near to the coast, suggests that effluent disposal problems could be solved at a cost in the lower range of the scale. For the additional population, a figure of about £20 a head for sewage disposal is a fair estimate.

23. Service sewers for foul and surface water, other than trunk sewers and house drains, will cost about £50 a head. It is difficult to obtain a figure for trunk sewers without detailed knowledge of the development of individual communities, but an allowance of £15 a head may be reasonable. Thus the total cost of sewerage services, at 1968 prices, may be about £85 a head of the additional population to be served.

24. Given all the uncertainties, it is not possible either to say when any specific sewer should be laid nor to determine the initial capacity of the associated treat-

ment plant that would give minimum cost over time as capacity is adjusted to cater for population growth.

25. An indication of the costs of expansion with regard to sewerage services may be based on the developments described in Chapters 4 and 5. An increase in population of about 56,000 by 1981, distributed as indicated in Diagram 8, might involve capital expenditure of about £5 million more than would be required for the present population. An increase in population of 300,000 by 2001, located broadly as indicated in Diagram 7, might require additional capital expenditure of about £23 million. As for water, the net capital cost of a population increase of 300,000 seems likely to be as low in Tayside as anywhere else in the country and probably appreciably lower than in many other potential development areas.

ELECTRICITY

26. Tayside Fife is within the area served by the South of Scotland Electricity Board, while Angus and Perthshire are in the area of the North of Scotland Hydro-Electric Board. Committed improvements include the reinforcement and extension of the major power lines that are used for interchange of power between the SSEB and the NSHEB area. This system is being built so that, when necessary, it can be upgraded to 400 kv.

27. The proposed network includes 275 kv overhead lines; one of these enters Tayside at Milnathort and runs north-west to bypass Perth, and then across Strathmore to the vicinity of Alyth from which point it runs north-east to Edzell and on to Kincardineshire. The other line will run from Westfield in Fife to Tealing, north of Dundee. It will skirt the east side of East Lomond Hill and traverse the Howe of Fife to a point where it will cross the Tay near Abernethy. The major part of this section will replace the existing 132 kv line between Redhouse and Abernethy Substations. After crossing the Tay the line will traverse the Carse of Gowrie to Tealing. Both of these lines raise issues of amenity and landscape conservation, and their detailed alignment has been the subject of discussions between the Electricity Boards and the planning authorities.

28. In the northern part of Tayside, the main centre of the distribution system is the 275/132 kv substation at Tealing north of Dundee. A number of 132 kv lines radiate from this point and these constrain development on the north and west sides of Dundee, in the Carse of Gowrie, and in the vicinity of Forfar and Brechin. This has been taken into account in selecting locations for the development of housing and industry.

29. The existing and proposed network of power lines provides a good basis for development. The improvement by the SSEB will substantially increase the capacity of the system in north and east Fife and no significant distribution problems are expected. The total distribution costs in the SSEB part of Tayside are unlikely to vary significantly among the patterns of population distribution that we have considered. In the NSHEB area there is spare capacity, and plans are in hand to provide for current trends in demand.

30. On the basis of present levels of demand the existing networks could provide for more than a doubling of the populations in Dundee, Perth, Arbroath and Forfar; but with demand rising at about 8% a year a large part of this unused capacity will be required for the future needs of the existing population. The plans now in hand for load growth in the 1970s should be reviewed by the Boards to take account of the growth possibilities discussed in Chapters 4 and 5 of this report.

31. At present the electricity consumed in Tayside is generated by the NSHEB at the Carolina Port station at Dundee and at hydro stations in Perthshire, and by the SSEB at stations on the Forth. NSHEB thinking about the expansion of generating capacity within Tayside envisages the possibility of major development at Carolina Port, and they foresee a need for a new generating station in excess of 1000 MW capacity on the north-east coast to meet future demand in this part of Scotland.

32. The SSEB have no plans for building generating stations in Tayside Fife in the near future. However, in the long run, they suggest that there may be a need for one and perhaps two large stations within the Region, each requiring coastal sites of about 100 to 150 acres. On the basis of their locational criteria, the SSEB consider that sites that could prove suitable exist at Tentsmuir, Kingsbarns, Elie Ness, or Ruddon's Point (Largo Bay).

33. The need for, and the siting of, major power stations in Tayside Fife in the near future. However, in the long run, they suggest that there may be a need for tance of these may change considerably, and thus we leave the Boards' indications regarding new generating capacity within Tayside for proper appraisal nearer the time when a major expansion of capacity, in the area north of the Forth, may be required. Nevertheless we should mention that present types of power station on any of the four suggested sites would conflict seriously with our suggestions for recreation and conservation on the Fife coast Chapters 10 and 27. In our view a more appropriate location would be in the vicinity of Easthaven (Angus) as shown on Diagram 7 in Chapter 4. In this area there are large, flat, coastal sites which would appear to be suitable for major industrial developments.

GAS

34. Tayside forms part of the integrated distribution system of the Scottish Gas Board which supplies it with gas for domestic, commercial and industrial use. A small proportion of Tayside's population lives in areas not supplied with gas.

35. The Scottish Gas Board estimates that the demand for gas in Tayside, given an unchanging level of population is likely to grow at 5–6% per annum to the mid-1970s, after which growth may be faster. This could give a rise in demand from about 24 million therms in 1968–69 to more than 50 million therms in 1980–81. Growth thereafter would probably be at a slower rate.

36. Natural gas will be available in Scotland in 1970 and Tayside should be converted to natural gas in the

course of the 1970s. While the capacity of the Tayside distribution system is adequate for requirements at the present time, augmentations are planned for certain areas as needed to meet the projected demand increases. The higher thermal content of natural gas has the affect of increasing the capacity of a distribution system, and this will greatly help to meet the rise in demand.

37. For gas (and for electricity) there is no significance in matching production and demand within Tayside because the Region is part of an integrated system of production and distribution; what matters here is bulk transmission. While a greatly increased Tayside population would create no significant technical problems with respect to supply, the location of additional population in the Region might give rise to somewhat higher transmission costs than would have been incurred had the extra population been located closer to the major natural gas pipeline which will run across the Central Belt of Scotland.

38. There are unlikely to be material differences in the costs of supplying gas among the principal distributions of population within Tayside, and systems of phasing, investigated in this Study. In the short-term, however, given the state of the existing system and recent renewals and reinforcements by the Board, there are certain areas in which expansion is likely to be less costly (up to a limit) than others. In Dundee the existing distribution network is capable of providing additional gas most easily on the east side. The increases in demand that would arise in Perth and Arbroath, given the full implementation of our first phase proposals, could be accommodated without difficulty.

TELECOMMUNICATIONS

39. The Telephone Manager in Dundee is in the process of reassessing the future provision of services in the light of current trends in population, incomes, and telephone usage. Under the current programme all telephone exchanges in Tayside are to be converted to automatic working by the early 1970s. When this is done all towns will have subscriber trunk dialling, but some rural areas will continue to obtain trunk calls via operators. Under fully automatic conditions operator assistance will be provided from Dundee, Perth and Montrose telephone exchanges, with the exception of a small area south of Fife Ness which will be served by Kirkcaldy. The routing of subscriber dialled trunk traffic to and from the area will be handled by trunk switching centres at Dundee, Perth, Montrose, Pitlochry, Blairgowrie, Forfar, Cupar and Crieff.

40. To provide for these improvements steps are being taken to build or extend telephone exchanges during the 1970s at the following places:— Blairgowrie, Bridge of Earn, Carnoustie, Coupar Angus, Crieff, Broughty Ferry, Dundee East, Dundee North, Ladybank, Monifieth, Montrose, Newport, St Andrews, Anstruther. We would expect the scale and timing of the requirements at each of these places and at other places not in the list, to be affected by the proposals in Chapters 4 and 5 of this report for the growth and distribution of the population.

22 The Regional Road System

1. The development of an efficient road system is clearly essential in a city region that is to attract people and industry. The increase in car ownership and frequency of use of the car, will generate substantial travel demands from the existing and the new population. In order to promote, in competition with other areas, the attractions of the Region, efficient access by road for work, shopping and recreation will be essential. For industrial and commercial interests costs of transport and distribution are important and a road system giving ready access to markets will be necessary.

2. As part of this Study the regional road system most suitable for the emerging city region has been investigated. Recommendations are set out for the road system which will carry traffic into or through the region, and traffic between the towns or districts of the Region. Roads *within* each district or zone are not included since they carry local traffic with different characteristics. These local roads are generally not variables within a regional distribution of traffic — and can be dealt with in a local transport plan. The local roads required by additional population in new settlements will entail costs more or less proportional to population.

3. The regional road system for Tayside is considered as follows:—

(1) The present situation and plans
(2) Methods used to assess future traffic flows
(3) The road requirements and costs for different population levels and distributions
(4) Road facilities required by the recommended distribution of population within the city region.

THE PRESENT SITUATION AND ROAD PLANS

4. The present inter-regional traffic pattern shows heavy concentration of traffic through Perth. Until 1966, when the Tay Road Bridge at Dundee was opened to traffic as a toll bridge, the Tay was not bridged for road traffic below Perth. Nearly all road traffic between the populous central area of Scotland and Dundee, Aberdeen, and the north-east of Scotland passed through Perth, and this situation has not been affected materially by the bridge at Dundee. The bulk of the traffic between Central Scotland and the North-West and central Highlands must also pass through Perth, failing use of the Highland roads through the Sma' Glen (A.822) or Glen Ogle (A.85), or the western routes through Argyll. The sparsley populated areas in the west and north of the Tayside area, and their extensions beyond that area contain popular holiday resorts and recreational areas of various kinds, and are attractive to touring traffic. At peak periods in the tourist season, the roads in these areas carry much traffic not directly related to the activities of the local population. To the south of the region, the population of industrial Fife adjacent to, but outside, the area exceeds the combined populations of Dundee, Perth and Arbroath. From the various considerations discussed above, it is evident that the pattern of traffic flows on the roads through the Region is strongly influenced by external factors.

5. The existing network for traffic moving within the Region may be seen as two radial systems, one from Perth and the other from Dundee, linked by routes through Strathmore and the Carse of Gowrie. Diagram 24 illustrates this network, and shows also the existing traffic volumes at significant points. Analysis of these volumes in relation to existing road widths and alignments shows that there is some spare capacity on some of these routes; on others, improvements or new link roads will be required even in the absence of any significant population increase.

6. Current thinking on future road improvements has been taken into account and, for the purpose of the traffic analysis, the following works have been allowed for in all the networks tested. These works, together with relevant improvements outside the Region, are as follows:—

(a) M.90 northwards to Craigend interchange south of Perth;
(b) Perth Outer Ring Road, including the Friarton Bridge;
(c) dual carriageways on the A.85 between the Friarton Bridge and the Invergowrie junction of A.85 and A.972;
(d) reconstruction of A.972 through Dundee;
(e) reconstruction of A.929 between A.972 and Forfar;
(f) by-pass of Forfar (A.94);
(g) by-pass of Brechin;
(h) new road between Halbeath (M.90) and A.915 north-east of Kirkcaldy;
(i) by-pass of Thornton and diversion of A.92 through Glenrothes;
(j) reconstruction of A.914 between A.91 and the Tay Road Bridge;
(k) new road linking M.90 with the Torryburn by-pass west of Dunfermline.

7. The current situation (October 1959) with regard to some of these schemes and other relevant work has been noted as follows:-

(a) The corporation of Dundee have commissioned a Land Use/Transportation Study, directed by Freeman, Fox, Wilbur Smith and Associates. The regional distribution of population and employment recommended in this Report has been used as part of the basis for this transport study.
(b) The Scottish Development Department put in hand in 1984 a 'Perth Case Study' for which

Messrs Jamieson and Mackay are the Consulting Highway and Traffic Engineers. Data from this study have been available to us.

(c) The length of the M.90 motorway immediately to the south of the Tayside Study area is under construction. Within the study area, it is at the design stage.

(d) Parts of the outer by-pass, or ring road, at Perth are being designed. These parts cover connection of the M.90 at Craigend, south of Perth, to the Perth–Dundee road, A.85, by Friarton Bridge (across the River Tay) and its approaches; and connection of M.90 at Craigend to the Stirling–Perth road (A.9) west of Perth. It is proposed at a later date to extend the by-pass west of Perth to join the Perth–Inverness road (A.9), to the north of Perth.

(e) The Perth–Dundee road, A.85, is being reconstructed to provide dual two-lane carriageways.

(f) Numerous smaller schemes within the area are included in current works programmes. A number of local traffic studies have recently been carried out, and others are in hand.

8. Analysis of the existing regional network end of the roadworks already planned showed that considerable external influences were acting on the regional traffic volumes and that a large future programme of work was envisaged. These factors suggested that a regional land use/transportation study taken to the detail normally associated with such studies would not be appropriate for testing the various city region forms that we wished to examine. It was therefore felt possible to construct a model which would enable adequate forecasts of future traffic flows on the regional road system to be made.

METHODS USED TO ASSESS FUTURE TRAFFIC FLOWS

The traffic model

9. Work on regional traffic models by Government Departments and others in Great Britain and France led to the view that traffic between any pair of traffic zones (if the zones are carefully selected) will depend mainly on the zonal populations, the levels of vehicle ownership therein, and travel time (or some similar 'impedence factor', such as cost of travel) between them. Other factors may be important but a model based on these three factors was constructed as an appropriate first step.

10. Field work was put in hand to measure journey times along the important traffic routes in the Region. The Study Area was divided into 27 traffic zones, consisting of groups of civil parishes. To these were added 7 external zones. The inter-zonal travel times determined include allowances for dispersion of traffic in terminal zones and terminal delays. Population data, and data on vehicle ownership were derived from the publications of the Registrar General and of the Ministry of Transport. Information on Dundee ward populations was supplied by the City Engineer. For estimating and forecasting purposes, 1965 was taken as the base year. Since the population and traffic data available were collected at various times over the period 1960–66, appropriate adjustments were made.

11. A vehicle ownership weighting factor was estimated for each zone and a provisional traffic model constructed. Inter-zonal flows through a set of points on the regional road network were then determined from the model. The model flows through these points were compared with actual flows in 1965, as nearly as these could be estimated, and it was found that the model provided a satisfactory general approximation to the actual flows. At some points, however, divergences were large. Some of these divergences were attributable to the toll charges on the Tay end Forth Bridges. By a process of trial and error, time penalties of 14 and 13 minutes respectively were established for these bridges. After adjustment for the effect of the time penalties, the remaining divergences which were not attributable simply to route preferences conformed to a discernible pattern, and were substantially eliminated by a further series of weighting factors, high for the 'playground' areas and low for the southern external industrial zones. For forecasting puposes, the vehicle ownership weighting was modified to allow for growth of vehicle ownership in accordance with methods developed by Mr J C Tanner at the Road Research Laboratory.

12. In making projections it would be misleading to allocate all inter-zonal traffic to the minimum estimated time path. Between many of the traffic zones, alternative routes differ little from each other in travel time. In practice, where journeys are long few drivers could select the fastest route with any certainty. In such cases flows were allocated to competing routes on what was deemed to be a realistic basis.

Prediction of future traffic flows

13. Population distributions by traffic zones were derived from the test regional city patterns (see paragraphs 19 to 22) and these were supplemented by S.D.D. estimates of future population in the external zones.

14. The basic network consisted of the existing road links and the new road links that are listed for the study area and adjacent areas, in paragraph 6. Inclusion of these new links produced new journey times for many routes and required recalculation of most of the aggregated inter-zonal journey times. This basic network retains the time penalties for the Tay and Forth Road Bridges.

15. It is probable that a large number of other improvements will have been carried out by 1981, and still more by 2001, but it is not practicable to make specific allowances for them. The effect of 'run of the mill' improvements is sufficiently covered by an allowance for them built into the model.

REGIONAL ROAD REQUIREMENTS AND COSTS FOR POSSIBLE POPULATION LEVELS AND DISTRIBUTIONS

Effects of construction costs and traffic capacity

16. Firm estimates of the cost of roadworks can be provided only after the engineering design of the works has reached an advanced stage, and land requirements are known. The engineering design may include problems relating to the siting of major bridges and other factors which will influence choice of routes. It is

not practicable to lay down a rigid regional network which will be immune from future alteration on the basis of the present Study. Cost estimates are not being quoted although the Study can suggest guidelines for the more detailed analysis of the Tayside road system which must follow.

17. Design capacities for the various types of carriageways are given in Design Table II and Table 3–20 on page 11 of *Layout of Roads in Rural Areas*, (H.M.S.O. 1968). These design capacities may be exceeded substantially, and for long-term forecasts, road capacities may be assumed which are even higher than those which can be contemplated at the present day. Acceptable capacities have steadily increased over the past 20 or 30 years. Motorways, for example, are at the present time carrying without appreciable difficulty although with some reduction in speed, 2,000 vehicles per hour per lane, a load in excess of their design capacity. The model does not, however, take account of traffic congestion on any route. Congestion tends to spread the traffic load over a road system, and it does not follow that where the traffic model shows that excessive flows are likely to occur on a road at a target date, constructional works on that road are necessarily required.

Choice of routes

18. We do not deal in this Study with the future status of roads (whether trunk, principal, etc.); we are concerned with the utility of the system recommended for the carriage of traffic and overall constructional cost. In testing the effect of various population distributions on the networks the following design criteria affecting choice of route were adopted.

(a) Dual carriageway roads in landward areas are designed for speeds of 70 m.p.h., and other major roads for 60 m.p.h. On new dual carriageway roads, access is normally provided at intervals of 3 to 6 miles. The absolute minimum spacing for sign-posting purposes is about one mile. To make the most of their high capacity and to minimise costs, it is necessary to concentrate traffic on a few major routes.

(b) Spacing of access to dual carriageway roads in urban areas of the order described above would destroy their utility as carriers of predominantly short distance urban traffic, and the closer spacing of interchanges, high land values, and other factors, make these roads expensive. Design speeds are therefore reduced, commonly, to 50 or 40 m.p.h.

(c) Use of a major road for both regional and urban purposes is, in consequence, undesirable, although sometimes unavoidable.

(d) The major regional roads must be convenient for inter-urban traffic, and a complementary system of feeder roads, and local roads for short-distance traffic which should be excluded from the major regional roads, is essential.

(e) Choice of routes in Tayside is further restricted by hilly country, existing development, and the need to avoid expensive river and estuarial crossings.

(f) Long lengths of new road, which cannot be brought into operation until the whole road is completed, are generally impracticable for financial and other reasons.

Option and costs

19. As already mentioned, following some early tests on alternative city region forms and resulting road systems, a decision was reached to base the future regional form on an evolution of the existing pattern. This meant that most of the later alternatives involved an assignment of the traffic generated to the existing and planned network and an evaluation of the cost and efficiency of upgrading that network.

20. The traffic generated by alternative population levels and distributions was assigned to appropriate routes for each circumstance. The width and design of each route was assessed and costed.

21. Three upper population levels were used based on differing land use and locational criteria assumed for each particular area and on varying the amount of land required for population relocated from existing urban areas. The net increases tested were for 245,000 people, 267,000 people, and the full remit increase of 300,000 people.

22. In addition the regional road network for the three distributions of population, given in Chapter 4, Table I, as options 1, 2 and 3, was investigated.

23. The results were compared with road requirements and costs assuming the continuation, more or less of existing demographic trends. For this, population projections OMLFI and EMHFI (Chapter 11) were taken, showing population changes of +61,000 and –7,000 respectively by the end of the century.

24. In this comparison we estimated the regional road requirements and approximate costs which might occur in any event by the end of the century and the additional costs attributable to an increase in population of 300,000.

25. In addition the costs resulting from existing plans and commitments were assessed and compared with costs resulting from road requirements in 1981 assuming an increase in population of 56,000 distributed as indicated in Chapter 5.

26. It must be emphasised that the cost comparison dealt with the regional road network. Estimates were not included for roadworks within residential areas or for work journeys within urban areas. In addition a cost analysis which looks 30 years ahead is useful perhaps only to compare general cost differences between regional patterns and between growth of varying type or amount.

27. With these limitations in mind the comparison of costs led to the following general conclusions:—

(a) The cost differences between the regional networks for the range for the upper population increases (+245,000 to +300,000) and for the three population distributions (options 1, 2, 3) were not material.

(b) For the phase up to 1981, given present trends and a population increase of 56,000, it would appear that additional regional roadworks would be necessary over and above those listed in paragraph 6. Paragraph 32, as summarised in column (b) Table 1, indicates the extra roadworks that may be required. Reference should also be made to paragraph 31.

(c) The anticipated level of expenditure on the committed and proposed roadworks within the region listed in paragraph 6, would need to be doubled in order to provide fully for the traffic which is likely to be generated by 2001 on the basis of present demographic trends.

(d) To cater for both the growth in demand from existing population and an increase of some 300,000 people a total expenditure of some three times the present committed and proposed allocations would be required.

Tay Road Bridge

28. Common to all the options is the location of population to the south of the Tay. The capacity of the bridge and its influence on population increase is not dealt with directly by the regional forecasts. The Bridge forms part of the urban system in Dundee, since the existing communities on the south side of the estuary, and new development north of Leuchars will, in effect, form extensions of Dundee. Urban traffic of this kind does not have the same characteristics as inter-town traffic. It has more pronounced peaks, whereas regional or inter-town traffic usually has a peak hour flow not exceeding 10 per cent of the flow during the 16 hour day (06.00 hours to 22.00 hours). The directional imbalance of urban traffic may also be more pronounced. Consequently, urban traffic requires more detailed analysis; the demands on the Tay Bridge will receive such analysis in the Dundee Land Use Transportation Study. The 16 hour flow derived from a regional model is not very helpful. Even where the average daily 16 hour flow of inter-town traffic and the peak hour work journey flows are known, if both are material, simple addition of the two peaks may not serve, as they do not usually occur at the same time.

29. Nevertheless, it was necessary to consider flows over the Bridge (which was assumed rather conservatively to have a capacity of 3,500 passenger car units in one direction) in order to calculate the additional population which could be accommodated south of the Tay. The population so calculated amounted to 45,000 additional persons. The various assumptions and the calculations are set out in the Appendix. The result may be varied considerably, if the 'model split' between public and private transport, or the 'occupancy rate' for private cars, or the location of employment, is altered.

ROAD FACILITIES REQUIRED BY RECOMMENDED DISTRIBUTION OF POPULATION

30. Based on the analysis and testing described, a recommended long-term regional road network was drawn up as part of the future city region pattern. The principal regional roads are illustrated in Diagram 7 which shows the long-term development potential of the Region to take a population increase of 300,000. In Diagram 8 we show the road requirements at 1981, assuming a population increase of 56,000.

31. We list below the recommendations for each part of the network, implementation of which will depend on realisation of the relevant population expansion and also on normal detailed engineering and cost-benefit investigations. We note the 1981 position and also comment on the impact of the different population distributions where appropriate. Diagram 24 shows the network and the forecast traffic volumes.

Road facilities required

32. These are listed below and summarised on Table 22.1

(a) *M90, A90 from Milnathort to Perth*
It will be necessary to maintain the existing A90 route, to serve the towns located thereon. Over the length between Bridge of Earn and Perth, and in the period between 1981 and 2001, the A90 will be required as a high capacity all-purpose road, despite the construction of the new motorway. Nothing should be done to impair its traffic value. In the period after 1981, traffic capacity may require to be increased. The new motorway, with dual two-lane carriageways between Milnathort and Craigend Interchange will be running nearly to capacity in 1981, and three-lane carriageways will be required for all three population distributions. This route may be relieved to some extent by the diversion of traffic to alternative routes, but any diversion of traffic is unlikely to be sufficient to affect these recommendations.

(b) *Proposed Friarton Bridge over the River Tay and approaches from Craigend Interchange to join the Perth–Dundee Road A.85*
It is likely that at some period after 1981, the proposed two-lane carriageways will be working to capacity. It does not follow that additional traffic capacity should be provided at this site. There may be some diversion of traffic to alternative routes. The need for additional capacity is so far ahead and so intimately connected with the detailed planning of Perth, that no specific recommendation is made on the method of providing it. (See paragraph (j) below.)

(c) *A.85 from the proposed Friarton Bridge to Invergowrie*
This road is in course of conversion to dual carriageways and much of the work has already been carried out. The two-lane dual carriageways are likely to prove sufficient in 1981 but will require widening to three-lane carriageways before 2001. Before 1981, further consideration should be given to restriction of access along the road and to grade separation at junctions, particularly at the junction with A.972 at Invergowrie.

(d) *A.972 between Invergowrie and its junction with A.92*
The regional forecasts do not deal directly with this road which has a dual function as a

primary distributor within Dundee and as a regional road. As indicated in paragraph 1B(c) these two functions should, where practicable, be separated, but the site conditions, tha spread of development north of the Kingsway (A.972), and the high ground to the north render the construction of a new road an inordinately expensive undertaking (if, in fact, a practicable one) in relation to the traffic advantages to be gained thereby. It is recommended that A.972 should retain its regional traffic function and that this should be taken into account in planning the urban primary system of Dundee. Part of the road already has dual carriageways. These will require extansion and improvement over the whole length of the road, and three-lane carriageways are likely to be required, with restriction of access and grade-separated intersections where practicable and economic.

(e) *A.92 between its junction with A.972 and Arbroath*
This road will be part of a linear development from Dundee to Carnoustie and connects Arbroath and Dundee. It will be required primarily as an urban distributor, and its capacity will depend on the planning of complementary routes. Dual carriageways will be required by 1981, and three-lane duals at a later date. By analogy with the traffic produced by population of similar size to that envisaged, including Dundee and Arbroath, and allowing for increase in vehicle ownership, A.92, when the proposals have been fully implemented, might then provide about half the traffic capacity required in the linear direction. The remainder could be provided by local roads not necessarily extending over the full length of the linear urban development. The change in character of the traffic using this route will render it less suitable for regional traffic.

(f) *A.92 between Arbroath and Montrose*
A single two-lane carriageway should provide sufficient capacity for this road. Additional capacity is proposed on an alternative route.

(g) *A.9 between Blackford and the western by-pass of Perth*
This road will requira reconstruction before 1981, and should be provided with dual carriageways. After reconstruction, it will have spare capacity for many years, which may be of service in relieving other routes.

(h) *Western by-pass of Perth, from Craigend to join A.9 north of Perth*
Dual two-lane carriageways will be required on this road, before 1981, and should be provided during the initial construction. The ultimate sufficiency of two-lane dual carriageways will depend on detailed planning of the urban primary network.

(i) *A.9 between the Perth outer by-pass and Pitlochry and northwards*
This road passes through difficult country. The traffic capacity of the existing route is low on that account. Present indications are that a dual 2-lane carriageway will be required immediately north of Perth, thence a single 3-lane carriageway as far as Pitlochry, whilst the forecasts based on increased populations indicate that for Option 1 dual carriageways would be required between Dunkeld and Pitlochry, and for the other population distributions a 3-lane carriageway would be overloaded in 2001. Eventually, therefore, consideration should be given to providing dual carriageways throughout. North of Pitlochry, traffic will diminish progressively towards the boundary of the Study Area at the Drumochter Summit, and ultimate improvement of this road to provide a single 2-lane carriageway of the normal 24ft. width will be appropriate. The seasonal nature of the traffic on this road has to be kept in mind. At the present time, north of Blair Atholl the average daily traffic in August is about twice the annual daily average.

(j) *A.93 between Perth and Blairgowrie; A.94 between Perth and Coupar Angus*
These roads are best considered together. At the present time, the A.94 is being widened to provide three traffic lanes. No further widening is likely to be required before 1981. Under the option 2 distribution, this might be sufficient in 2001 if A.93 were also improved to a three-lane standard. It would be preferable to concentrate resources on one route, and it is recommended that for the option 1 and 3 population distributions at least, and preferable also for option 2, that dual carriageways should be provided between Perth and Coupar Angus. They might be based on the A.94 route, but traffic of that order would necessitate by-passes of development along the route, and the alignment to be followed might well incorporate parts of both roads. An alternative long-term solution might involve a crossing of the River Tay and a junction with A.9 north of Perth. This would require an expensive river crossing, and a cosiderable length of new road construction; and might also require additional works on A.9 south of the juntion, and on parts of the Perth by-pass. The corresponding benefits would include improvement of the traffic situation within Parth, and some relief of the Perth bridges and Friarton Bridge; better utilisation of the A.9 between Perth and Stirling; and relief of the M.90 south of Perth. Much more engineering investigation is necessary to find the appropriate solution but datailed investigation at the present time would be premature. It should be kept in mind that the reconstruction of A.94 now in progress will probably be sufficient for the next 20 years, and that the solution depends upon implementation of the proposed population

distributions for the Blairgowrie-Coupar Angus and Perth areas.

The A.93 between Blairgowrie and the County boundary with Aberdeenshire will be improved, but there are no proposals affecting the general characteristics of this road.

(k) *A.94 between Coupar Angus and Forfar By-pass*

A single two-lane carriageway will be sufficient in 1981. By 2001, three lanes will be required.

(l) *A.929 from the Kingsway, Dundee (A.972) to Forfar By-pass*

From the regional point of view the M.90 (including part of the southern by-pass of Perth and the new Friarton Bridge)—Dundee—Forfar—Brechin route would appear to be the preferable corridor route through Tayside from the Central Belt of Scotland to the North-East. However although the Dundee—Brechin section and several possible alternatives to this have been the subject of much consideration during the course of the Study, some of the factors influencing the choice of route depend on conditions outside the Study area. Furthermore, the southern and of the Forfar Road between the City boundary and the Kingsway will serve in the dual role of regional road and city primary distributor, and will in addition serve extensive housing areas to the east and west. The full implications will need to be reassessed therefore in the light of the Dundee Land Use Transportation Study. If this route is confirmed as the main regional road, dual carriageways will be required between the Kingsway and the Forfar by-pass by 1981, so the intermediate three-lane stage should be omitted on this road. The existing single two-lane carriageway will require early improvement and regrading. It is unlikely that three-lane dual carriageways will be required.

(m) *Forfar By-pass*

This proposal originated as a scheme for the relief of traffic within Forfar and follows a line to the west of the burgh, connecting A.929 with A.94 north of Forfar. As part of a through route (see (l) above), the by-pass is considered appropriate. Dual two-lane carriageways will be justified before 1981, and will be sufficient in 2001.

(n) *A.94 from Forfar By-pass to Brechin*

Dual carriageways will be justified before 1981, and will suffice in 2001.

(o) *A.94 from Brechin northwards*

A by-pass of Brechin on A.94 is recommended. The by-pass and its continuation as a single two-lane carriageway is likely to be grossly overloaded before 1981. Two-lane dual carriageways will be justified by 2001, but at that date would have ample reserve capacity. On this length, three-lane carriageways might be justified as an intermediate stage.

The Study area boundary lies at the crossing of the North Esk where a new bridge and diversion are proposed for the near future.

(p) *A.914 from its junction with A.92 north of Glenrothes to the Tay Road Bridge, Dundee*

This forms the principal approach road from the proposed new East Fife regional road, Kirkcaldy, and Glenrothes, to the Tay Bridge, crossing the A.91 route from Milnathort to Cupar and St Andrews. From A.91 northwards, it takes traffic from the M.90 (A.90) route via Milnathort, and over its whole length, traffic from Edinburgh and the Lothians via the Forth Bridge and East Fife regional road, and traffic using Kincardine Bridge. Although M90 will take the major share of the traffic between East Central Scotland, the traffic using the A.914 route will still be considerable. A.914 is being progressively improved to meet the conditions arising from the opening of the Tay Bridge. The single substandard two-lane carriageway road seems likely to be overloaded before 1981 and to require dual carriageways in 2001. The intermediate three-lane stage is not recommended here. Development near the southern bridgehead will absorb some of the traffic capacity of the Bridge. Unless conditions change, two-lane dual carriageways on A.914 will have reserve capacity in 2001.

(q) *A.91 from its junction with M.90 near Milnathort to its junction with A.914*

This road is likely to be overloaded before 1981, and dual two-lane carriageways will be required. An intermediate stage is not recommended.

(r) *A.91 from its junction with A.914 to Guardbridge*

The existing carriageway seems likely to be sufficient in 1981. At a later date, three traffic lanes may be required.

(s) *A.91 between Guardbridge and St Andrews*

A single carriageway should prove sufficient until 1981, but reconstruction will be necessary long before 2001. Dual two-lane carriageways should then be provided. They will have reserve capacity in 2001.

(t) *A.85 between Perth, Crieff and Lochearnhead*

A single two-lane carriageway will be sufficient, except that local widening to three lanes may be required at places, particularly between Crieff and Gilmerton and west of Perth. Between Crieff and Lochearnhead, many local improvements not affecting the general characteristics of the road will be required.

(u) *A.923 between Coupar Angus and Liff*

For option 2 a single two-lane carriageway may be sufficient, apart from local widening, but for options 1 and 3 lanes will be needed late in the period 1981—2001. To some extent traffic is transferrable to A.927, which will not require more than two lanes and will have reserve capacity throughout the period to 2001.

(v) *A.933 from Arbroath to Brechin*
Apart from local requirements a single two-lane carriageway may prove sufficient as an ultimate layout. Numerous local improvements are required on this road.

(w) *A.913 from its junction with A.90 at Baiglie to Cupar*
Between Baiglie and Newburgh three lanes will be needed towards the end of the period 1982–2001. East of Newburgh a single two-lane carriageway will be sufficient.

(x) *A.915 from Leven to Upper Largo*
A three-lane carriageway would be required shortly after 1981, and would be approaching capacity in 2001. Eastwards of Upper Largo traffic on the roads in the East Neuk of Fife is likely to remain relatively light and no specific recommendations are made.

TABLE 22.1 Summary of Road Improvements Required (Dual carriageways only)

Para. 32 ref.	*Route*	*By 1981 (+56,000 popn.)*	*By 2001 (+300,000 popn.)*	*Length[1] within Study Area in miles*	*Remarks*
a)	M.90 (Milnathort–Friarton Viaduct)	2 + 2[2]	3 + 3[3]	11	2 + 2 in current programme, nearly to capacity by 1981.
b)	M.90 – Friarton Viaduct – A 85 (ie Perth Southern by-pass)	2 + 2	2 + 2	2	2 + 2 in current programme.
c)	A.85 to Invergowrie	2 + 2	2 + 2	16	2 + 2 in current programme.
d)	Kingsway to A.92	3 + 3	3 + 3	6	Subject to urban planning of complementary routes.
e)	A.92 from Kingsway to Arbroath	2 + 2	3 + 3	15	Will be absorbed in part in linear urban extension.
g)	A 9 Blackford to western ring	2 + 2	2 + 2	16	Current proposals include comprehensive improvement. 2 + 2 will provide spare capacity for many years.
h)	Perth west ring (M.90 to A.9)	2 + 2	2 + 2	5	Subject to urban planning of complementary routes. Length M.90 to A.9 at Broxden in current programme.
i)	A.9 Perth to Pitlochry	2 + 2	2 + 2	28	Tourist traffic and difficult alignments suggest dualling eventually. Current proposals include comprehensive improvement.
j)	Perth Blairgowrie A.93) Perth Coupar Angus A.94)	3	2 + 2	15 13	Considered as one route. A.94 being widened to 3 lanes under current proposals
l)	A.929 Kingsway to Forfar	2 + 2	2 + 2	12	Early improvement and regrading required
m)	Forfar By-Pass	2 + 2	2 + 2	4	
n)	A.94 Forfar to Brechin	2 + 2	2 + 2	14	
p)	A.914 Glenrothes to Tay Road Bridge	2 + 2	2 + 2	23	2 + 2 will provide spare capacity for many years except near southern bridgehead.
q)	A.91 from M.90 to A.914	2 + 2	2 + 2	12	2 + 2 will provide spare capacity for many years
s)	A.91 Guardbridge – St Andrews	–	2 + 2	4	

Notes:
(1) Mileages are the approximate length where road exists, and probable length where road proposed.
(2) 2 + 2 = dual two-lane carriageway
(3) 3 + 3 = dual three-lane carriageway

Appendix to Chapter 22

CAPACITY OF THE TAY ROAD BRIDGE AND THE IMPLICATIONS FOR POPULATION EXPANSION IN NORTH FIFE

A1. In estimating the future capacity of the Tay Road Bridge the restrictions on flows due to the present designs of the terminal interchanges has been discounted. If the need arose these could be adjusted, though with some difficulty, so as to cope with the maximum flows that could be carried by the bridge itself.

A2. Likewise it is assumed that restrictions arising from present methods of toll collection would be overcome by changes in the long term.

A3. The bridge has dual 22-feet carriageways, end on the basis of current assumptions the capacity in one direction would be put at about 2,750 passenger car units (p.c.u.) per hour. It is generally agreed, however, that on bridges the flow in a single lane may be increased to as much as 2,000 p.c.u. per hour for short periods. This is an unstable level, but taking available evidence into account it is estimated that the traffic capacity in the heavier direction could be taken at 3,500 p.c.u. per hour.

A4. Taking 3,500 p.c.u. as the maximum peak hour flow of commuters from south to north, and assuming, on the basis of other surveys, that this peak represents about 60% of all commuting in this direction, then the total commuting movement from Fife across the Tay Bridge in the whole of the work journey period could be about 6,000 p.c.u.

A5. The number of commuters represented by a flow of 6,000 p.c.u. depends on the ratio of cars to buses, and on the average number of persons carried by these different types of vehicle. If we assume an average of 1.2 persons per car and 35 persons per bus, and something between 35% and 70% car users, the total number of commuters from south to north by all forms of road transport might be between 8,000 and 12,000 (the latter corresponding to the lower percentage of car users).

A6. Because of the proximity of Dundee there may be limits on the amount of employment that could, or should, be located in North Fife. If we assume, however, that half of the resident working population find employment locally or southwards from the bridge, the total working population living in the southern bridgehead area would be twice the number of commuters to the north shore estimated in paragraph 5, *ie* some 16,000 to 24,000 workers. In more precise calculations some additional allowance would be required for the small number of people off work because of sickness, etc.

A7. The working population in new and expanded communities is generally about 45% of the total population, and, therefore, on this assumption the total populations corresponding to the numbers of workers in paragraph 6 would be 36,000 to 53,000 persons.

A8. The present population in the southern bridgehead area is about 8,000 persons. If this is deducted from the figures in paragraph 7, the size of the new population which could be located south of the Tay Road Bridge without overloading it, lies within the range of 28,000 to 45,000 persons.

A9. The figures in paragraph 7 of the potential population in the southern bridgehead area are derived from all the assumptions in the previous paragraphs on travelling times, mode of travel and the location of employment. The conclusion is that the Tay Road Bridge could provide for an expansion of 45,000 population in North Fife providing that:—

- (a) 40% of the commuters to the Dundee area travel outside the peak hour period;
- (b) 65% of the commuters travel by public transport rather than by car;
- (c) 50% of the workers living in North Fife find their employment south of the Tay (this would require about 12,000 new jobs within the southern bridgehead area or in other parts of Fife within commuting distance).

A10. These conditions are unlikely to be achieved unless special measures are taken, but they are not unreasonable aims. On this basis, therefore, it is suggested that, in round terms, up to 45,000 persons could be located around the south end of the Tay Road Bridge.

A11. For a higher population than this, one or other of the following steps would have to be taken:—

- (a) increase the proportion of travellers by public transport to more than 65% of commuters;
- (b) create more than 12,000 jobs south of the Tay;
- (c) build a second road bridge.

23 Transport

1. This chapter discusses road haulage and bus services, and also rail, sea and air transport. Roads are discussed in Chapter 22.

2. Tayside has three types of transport problems. First, there is its distance from the main UK and European centres of population. Long haul to these markets raise the delivered cost of products and make reliable deliveries more difficult to achieve. Secondly, there is the provision of services (especially for passengers) for outlying communities, an internal problem shared with many other areas. Thirdly, there is urban congestion associated with the increasing use of private cars for shopping and work journeys. This problem is common to most towns in the UK, and although it is still comparatively less serious in Tayside it is rapidly becoming a major issue.

3. The problem of distance from markets and supplies make it necessary, if growth is to be encouraged, to create good external transport arrangements. Special efforts should also be made to attract industries for whom the costs of long hauls are relatively insignificant proportions of total costs. These include industries with a high value-added content; industries with a high proportion of material inputs obtained from abroad by sea; industries with high proportions of exports; and industries in which firms cater for regional rather than national markets. Mention should also be made here of Tayside's current status as a Development Area, the benefits from which can help to offset the advantages of locations nearer to main markets, principal suppliers, and existing plants.

The demand for transport in Tayside

4. The demand for transport can be divided into two parts. Demand for freight transport is related to the nature, location and level of activity of the agricultural, industrial and commercial centres. Demand for passenger transport is principally a function of the size and distribution of population within the Region, the location of its service centres and workplaces, and the level of ownership and use of private cars.

5. Detailed assessments of present demand in the freight and passenger sectors were not necessary for the purposes of the regional survey. For freight, Tables 23.1 and 23.2 (based on our Industrial Survey) give a broad but incomplete, picture of destinations and transport modes. The major markets for the Region's manufacturers require extensive use of medium and long distance transport (Table 23.1). Road transport, for the whole journey or for transhipment, is by far the most common method used (Table 23.2). Table 23.3 shows the transhipment destinations of exports from Dundee; the greater quantity goes to Forth and Clyde ports.

6. The demand generated by agriculture is normally a small proportion of the total demand for freight transport. However at harvest time it becomes relatively more important. Movements, for example of soft fruit and vegetables, tend to be for short distances to local processing plant.

7. Demand from industry is concentrated on movement of goods over medium and long distances, principally by road. The jute industry is a notable exception, the majority of its raw material imports coming through the port of Dundee. Other exceptions are oil for an electricity generating station and a private firm, both located in the harbour area and receiving cargoes direct from tankers. The commercial sector generates a substantial demand for road transport for local deliveries.

8. Demand for public passenger transport is divided mainly between road and rail, but with some limited use of air services. In the main, these different modes deal with the demands from different markets, but there are no rigid divisions. Thus local short-haul movements are served by bus but there are also appreciable movements by rail. Medium-haul movements are served by rail, but there is some competition from bus transport. Long-haul passenger movement is principally by rail, but there is competition from air and on some routes it is possible to go by bus.

TABLE 23.1 **Markets served by Tayside Industries**

Region	*1967* %	*1970* %	*1975* %
Tayside	11	10	9
Rest of Scotland	24	23	24
England Wales and Northern Ireland	44	46	45
Overseas	21	21	22
	100	100	100

Source: Industrial Survey. (Data from firms accounting for a quarter of Tayside manufacturing employment in 1967.)

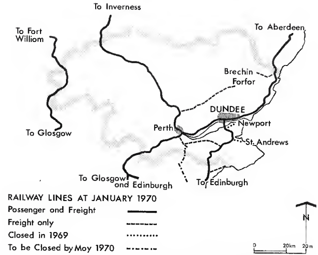

TABLE 23.2 Transport Methods Used by Tayside Industries

		% of sales value
1.	By road only	53
	By road for transhipment:	
2.	to rail	1
3.	to sea	23
4.	to air	6
5.	to port	–
	Total % of output leaving works by road	83
6.	By rail only	6
	By rail for transhipment:	
7.	to sea	–
8.	to air	–
9.	to road	–
	Total % of output leaving works by rail	6
10	By sea only	6
11.	By port only	5
		11

Source. Industrial Survey. (Data from firms accounting for a third of Tayside manufacturing employment in 1967.)

RAIL TRANSPORT

9. By the middle of 1970, Tayside will be served by four main railway lines carrying both passengers and freight and by three minor lines carrying freight only (shown on the accompanying sketch map). The main lines have been designated by British Rail for long-term retension and development. They are:—

1. Edinburgh — Forth Bridge — Tay Bridge — Dundee — Arbroath — Aberdeen;
2. Glasgow / Edinburgh — Stirling — Perth;
3. Perth — Dundee; and
4. Perth — Inverness.

TABLE 23.3 UK Port Destinations of Dry Cargo Exports from Dundee Area, 1964

	Liverpool	*Glasgow*	*Grangemouth*	*Leith*	*Others* *	*Total*
Thousands of tons	4	17	8	3	4	36

* includes Port of Dundee

Source: NPC, *Digest of Statistics*, 1966

The list shows the importance of Perth as a nodal point of the railway network. It is also a main terminus for motorail services.

10. The railway rationalisation programme has closed some passenger services in Tayside since 1963. Not all lines or services reported to be unremunerative have been closed and the following services received 'unremunerative rail passenger service grants' in 1969.

1.	Edinburgh—Perth *via* Kinross (Note (i))	£241,000
2.	Edinburgh—Dundee—Arbroath *via* Kirkcaldy	£152,000
3.	Edinburgh—Dundee—Arbroath *via* Dunfermline	£ 91,000
4.	Montrose—Dundee—Perth (Note (ii))	£178,000

Note (i) All passenger services withdrawn between Cowdenbeath and Perth with effect from 5 January 1970. From this date the Edinburgh — Perth service was diverted *via* Stirling.

Note (ii) Service reduced from 5 January 1970.

Certain services have been speeded up, and the average journey times are as follows:—

Dundee–Edinburgh	95 minutes
Dundee–Aberdeen	86 minutes
Dundee–Glasgow	105 minutes

For 1970, the grants for services in Tayside are as follows: all of these services are to be grant-aided for two years.

Edinburgh–Dundee *via* Kirkcaldy	£319,000
Edinburgh–Dundee *via* Dunfermline	£283,000
Montrose–Dundee–Perth	£131,000

11. Rationalisation has also affected freight services. In Tayside, since 1963, a number of lines and stations have been closed and traffic, where possible, has been concentrated to make possible economies of mechanical handling and to develop fast, regular rail services that will carry traffic over medium and long distances.

12. Coal provides the bulk of the freight transport at present moved by rail in Tayside (258,000 tons were dealt with at Dundee and Perth in 1968). Seasonal movements of agricultural produce, especially potatoes, are also important.

13. It is expected that one of the four main depots in Scotland for freight sundries will be developed at Dundee. Meanwhile provisional assurance has been received from the National Freight Coporation that a mini-freight liner terminal, capable of handling about 200 tons per night, will be built at Dundee given an adequate demand for the rapid transport of unit loads. An underlying problem is that of balance: rail freight traffic from Dundee is much heavier than traffic into Dundee. One reason for this is that goods for Tayside often come by rail to Glasgow and finish their journeys by road..

14. There is considerable spare capacity at present in passenger and freight rail services. On some passenger services, seat occupancy is about 60% but the patronage of others is only about 20%. On the passenger side the railways could absorb e very substantial increase in patronage and with freight there could be an immediate increase of 20% in wagon loads.

15. Railways in the Region have now been reduced to basic lines and consequently there is little scope for further closures. Some further changes in services, such as those recently made to the Montrose-Dundee-Perth service, are regarded as possibly necessary by British Railways. In general it is true to say that costs have been increasing at a greater rate than revenue. All services are under review for possible economies.

16. In the period up to 1981 at least, even if Tayside achieves our most rapid envisaged rates of growth of population and industry, we can predict only small increases in railway revenues for existing services and lines and, therefore, no significant changes in their finances attributable directly to the realisation of our proposals. It follows that if any loss-making line or service is to be retained, a sufficient case must already exist or must be found from other than short-term considerations.

17. We view the lines and services at risk as follows. First, there are the three lines open at present only for freight: Forfar-Stanley; Brechin-Montrose; and Ladybank-Newburgh-Perth. We can add nothing of significance in the short run to the existing cases for retaining these lines end services. In the long run, the cases for retaining them will be strengthened if our suggested distribution of a larger Tayside population begins to be achieved. We think that decisions on the future of these lines and services should be made *ad hoc* in the light of decisions on, and the progress of, our general scheme.

18. Secondly, there is the line from Dundee through Fife to Edinburgh, using the Tay and Forth rail bridges. So far as north of the Tay is concerned, the loss of this line would not significantly affect movements of freight by rail. Again, passengers could still travel to Edinburgh by way of Perth, though this would probably take an appreciably longer time than at present. Our proposals, however, strengthen the cese for the long-run retention of this line. We envisage substantial increases of population on the immediate south bank of the Tay and in the general area of Cupar and St Andrews. There would also be some industrial development. Moreover there will be further substantial growth in the Glenrothes area, and in the long run we hope that Glenrothes will have closer links with Tayside than it has at present. In addition it may be worthwhile, some years from now, to examine the possibility of re-opening the Newport-Dundee line. For these reasons, we would regard the closure of this Dundee-Edinburgh line as, potentially, a major threat to the development of Tayside Fife and the proposed city region. Without at least part of this line, there would be no effective rail link between the two parts of the Dundee Expansion Area and only a very poor rail link between Dundee and Tayside Fife.

19. Thirdly, there are the main lines running north and southwards from Perth, and the Perth–Dundee–Arbroath Montrose–Aberdeen line. We assume that all of these lines will be retained. The lest of them runs along the Perth–Dundee–Arbroath corridor in which we envisage substantial development of population and industry.

20. We distinguish between lines and the services on these lines. So long as serviceable lines exist, questions of the level of services can be dealt with *ad hoc* in the light of our proposals, progress towards their realisation, costs and revenues, and the general arrangements for grants in aid of services.

ROAD GOODS TRANSPORT

21. The Industrial Survey gave a broad indication of the importance of road goods transport to the Region (Table 23.2). Demand for these services comes from the primary sector, industry, amd the services sector.

22. Agricultural demand, mostly for short hauls, is the most important component of the primary sector. High transport costs have led the soft fruit and vegetable processing industry to locate within the Region close to sources of supply. But the meat-processing industry is less tied and supplies go to processors outside Tayside. Recent railway closures have placed heavy demands on road transport for the movement of potatoes, sometimes as far as East Anglia. There is a notable peaking of demand at harvest time when heavier specialised vehicles may be required. Some criticism has been made of the rural bridges etc in the Region, and their ability to carry the larger vehicles now available.

TABLE 23.4 Goods Vehicles in Tayside in 1966
(as shown by current licences)

	GENERAL			*AGRICULTURAL*		
	Not over 1½ tons	*1½–3 tons*	*Over 3 tons*	*Not over 1½ tons*	*1½–3 tons*	*Over 3 tons*
Angus	1168	383	597	334	121	78
Dundee	1931	784	1171	28	15	17
Perth County	2036	589	987	603	184	119
Fife (25%)	600	240	400	110	40	30
Tayside total			10,886			1679
Scotland total			113,890			9839

Source *Highway Statistics* 1966

23. Demand from industry for outward movements is analysed in Table 23.2 (for those firms giving information). Much of the demand from this sector is for medium and long hauls.

24. A substantial part of the demand for road transport is for local delivery, especially in retail and wholesale distribution. Demand from this sector is likely to increase at a slightly higher rate than population as incomes rise, and as retail outlets and wholesale depots are concentrated into fewer, larger units.

25. The structure of road goods transport operations in Tayside is outlined in Table 23.4. In 1966, Tayside, with less than 9% of Scotland's population, had about 19% of the agricultural vehicles in Scotland and more than 10% of general goods vehicles. The agricultural ratio reflects the importance of Tayside in the agricultural economy of Scotland; the general ratio may be a consequence of the distance of Tayside from its markets and the apparently high use of road transport by its industrial firms.

26. Operators on own account (C-licence holders) are 85% of total licence holders in the UK. There is no reason to believe that the industry in Tayside is not similar in structure. The work of these C-licence operators is, for the most part, integral to the activities of the concerns served. The rest of the licences (A and B) are held by road haulage contractors.

27. There are 91 operators in Tayside who advertise themselves as road haulage contractors (1969). Employment remained fairly steady at about 1800/2000 for the period 1960–68, apart from a fall appreciably outside that range in 1967.

28. The industry in Tayside consists of a few firms operating at an inter-regional level, some smaller firms operating at regional and local levels, and a large number dealing with only local movements. The larger firms often run scheduled services or contract to specific firms for outward loads. They include British Road Services with depots located throughout Tayside, and ten or so private firms. Some of the latter appear to do much of the business of particular areas within the Region. One of the larger firms specialises in the delivery of parcels, etc, in Dundee. The smaller firms are, in the main, concerned with local contracting either in rural areas or in towns; they rarely work in both areas.

29. The road goods transport industry in Tayside is flexible and able to expand capacity relatively quickly to meet new demands. It has the advantage of a regional and intra-regional road network that is relatively free from congestion. While certain provisions of the 1968 Transport Act may reduce capacity in the short run, no obstacles are seen that would necessarily prevent the industry from expanding in the long run to meet all the requirements likely to be placed upon it. The provision, in time, of freightliner terminal facilities in Dundee would compete with long distance hauliers and reduce the proportion of the (expanded) business that would otherwise have been gained by them.

BUS SERVICES

30. The demand for bus services has fallen as a result of the increasing use of private cars, although many people still have no alternative to the bus for most journeys. Over the last decade, the number of passengers carried on Dundee Corporation buses fell by about a quarter. According to information received from the bus operators, over a 10-year period to 1968 the Northern, Midland and Fife Companies carried fewer passengers in almost all routes, the decrease on some routes possibly being as much as 60%. Demand has fallen relatively more in rural areas, where the level of car ownership is higher, than in urban areas. The services showing the lowest rate of decrease are those from Dundee to Forfar, Blairgowrie, Cupar and St Andrews, respectively. There have been slight increases in patronage in the town services in Montrose and Arbroath.

31. Passenger bus services in Tayside are provided by the Scottish Bus Group, Dundee Corporation, and private enterprise. The Scottish Bus Group, through the Northern, Midland and Fife Companies of Messrs. W Alexander and Sons, provide town services for Perth, Arbroath and Montrose and intra-urban and rural services for most of Tayside. There are regular services to Stirling, Glasgow, Kirkcaldy and Aberdeen, and long-distance coach services to these and other towns, including Edinburgh, in association with Eastern Scottish and Highland Omnibuses. Services within Dundee are provided by the Corporation, although there may be, in time, the possibility of the undertaking's being taken over by the Scottish Bus Group. Additional services of a local nature are provided by private enterprise. Further facilities provided by all operators include the carriage of parcels and the supply of coaches for excursions and hiring.

32. The daily services provided by the Scottish Bus Group centre on Dundee and Perth. From Dundee, there are services of at least half-hourly frequency to Perth, to Arbroath, to Forfar and Kirriemuir, and to Wormit and Tayport. There are hourly services to Blairgowrie, Alyth, and Montrose; and to St Andrews, Cupar, Crail and Leven. Services from Perth include half-hourly services to Kirkcaldy and hourly services to Crieff and Newburgh. The smaller towns and the rural areas are not so well served; there are, for example, no through services in

Strathmore from west to east. Private operators provide rural feeder services and contract services to hospitals in areas not served by the Scottish Bus Group.

33. Rural and urban bus services in Tayside encounter the problems found elsewhere in Great Britain. Falling demand has meant that rising costs cannot always be covered by revenue. Increase in fares have encouraged even greater use of private cars. A high proportion of existing services in the area run at a loss. In the towns, demand peaking and traffic congestion have raised capital and operating costs, although it is here that revenues are highest.

34. A larger population will tend to increase the demand for bus services. But if the present trend towards increased use of private cars continues, the potential future profitability of many bus services in Tayside must be extremely doubtful, even in the unlikely event of costs remaining constant or declining.

35. It is unrealistic to suggest that bus services should be restricted to profitable routes. There are strong social reasons justifying the maintenance of a basic network of bus services (see Chapter 12). There are many people who either cannot afford or are unable to use private transport. There must be at least a minimum provision, in rural areas in particular, for movements to and from shopping and services centres. Moreover, in urban areas the bus has potential for reducing traffic congestion.

36. It is difficult to see how the problem of providing a basic network of bus services may be solved. The 1968 Transport Act provides a framewok within which policies can be devised and experiments undertaken. Economies may be achieved by amalgamating and rationalising existing services, *eg* amalgamation of the services of Dundee Corporation with those of Alexander's, use of one-man operated buses. Co-ordination of bus services with those of other modes of trans-

TABLE 23.5 Trade Through the Port of Dundee, 1962–68 (in thousands of tons)

	1962–3	*1963–4*	*1964–5*	*1965–6*	*1966–7*	*1967–8*
			FOREIGN TRAFFIC			
IMPORTS						
Textiles, fibres fabrics	180	128	154	166	117	164
Petroleum products	72	86	86	83	79	110
Other	66	72	82	61	68	77
Total	318	286	322	309	265	351
EXPORTS						
Textiles, fibres fabrics	2	2	3	3	1	4
Petroleum products	2	2	2	–	1	2
Other	2	3	3	8	2	1
Total	8	7	8	11	4	7
			COASTWISE TRAFFIC			
INWARDS						
Textiles, fibres fabrics	3	2	1	2	1	..
Petroleum products	49	49	63	130	325	356
Other	61	38	35	43	26	16
Total	113	89	99	175	352	371
OUTWARDS						
Textiles, fibres fabrics	..	..	..	–	–	–
Petroleum products	4	7	6	4	2	4
Other	1		1			
Total	5	7	7	4	2	4

Source: Dundee Harbour Trust

TABLE 23.6 Trade Through Scottish Ports 1966 (Excluding Fuel)

	Volume (thousands of tons)	*Value (£ million)*
WEST COAST		
Clyde	4,607	301.8
Other Ports	310	9.8
EAST COAST		
Aberdeen	429	13.8
Dundee	217	23.6
Kirkcaldy	276	3.6
Grangemouth	1,103	100.9
Leith	1,020	86.3
Other Ports	273	7.2
Total	8,136	547.0

Source: National Ports Council (1967)

port, especially rail, will tend to raise demand while reducing inconvenience to passengers. The suggestion of siting a new bus station close to the Tay Bridge Railway Station in Dundee is an example of this. There appears to be scope for experiments with a more flexible structure for fares and the possible co-ordination of bus services in rural areas with other services such as mail and milk deliveries. Finally, under the 1968 Act, local authorities are empowered to make grants to support socially desirable but unprofitable services.

PORTS AND SEA TRANSPORT

37. The only major port in the Region is at Dundee; other harbours capable of handling very small cargo ships include Montrose, Arbroath, Tayport, Newburgh and Perth. Trade through the Port of Dundee for the period 1962/68 is shown in Table 23.5. A substantial imbalance of outflows and inflows is clearly brought out. Imports and inwards coastwise traffic range from 375,000 tons to 722,000 tons, whereas exports and outwards coastwise traffic range from only 6,000 tons to 15,000 tons.

38. Textiles and petroleum products are by far the most important cargoes. The jute industry accounts for the relatively large imports of textiles, fibres, etc. Petroleum products cover the import of crude oil for refining, petrol for bulk storage, and fuel oil for electricity generating station, the last being the reason for the considerable growth in coastwise imports. The other main commodity handled is timber from Scandinavia, annual imports being about 40,000 tons. The limited range of cargo types reflects the port's dependence for traffic on the City of Dundee, the remainder of its hinterland consisting mainly of agricultural and rural areas. This situation is very different from that of the Forth and Clyde estuarine ports which occupy the central position in sea transport in Scotland, (Table 23.6).

39. Revenue for the Port of Dundee, for the period covered by Table 23.5 ranged between £275,000 and £330,000 a year. Expenditure has grown annually mainly as a result of rising maintenance and management costs and capital charges. Successive deficits in 1966/67 and 1967/68 compelled the Harbour Trust, in 1969, to raise rates on ships and cargoes by 30%. There is unlikely to be any significant increase in the quantities of the major commodities currently handled by the Port, namely jute and petroleum products, in present circumstances; indeed imports of raw jute are likely to fall in the course of the 1970s. Further increases in rates will be necessary if traffic from new sources does not emerge.

40. At present the Port has two main wharfs totalling about 2,100 ft. in length with accommodation to depths of 25–28 feet at mean low water spring tides (M.L.W.S.) the accepted limiting depth measurement. There is additional wharfage of 1,500 feet, a proportion of which requires renovation with 20 feet of water at M.L.W.S. The deeper accommodation is adequate for bulk carriers of 16,000 dead weight tons and cargo liners of about 10,000 dead weight tons, but the size of ships that may conveniently use the Port is further restricted by the navigation channel which is only 18 feet deep in places at M.L.W.S. The rise of tide at spring tides is 15½ feet, so that a draft of 33½ feet is provided at high water. No physical difficulty is known to exist that would prevent dredging of the channel to provide greater depths.

41. Apart from congestion caused by the seasonal jute traffic, importing occurring within a period of 3–4 months, the Port is capable of handling considerably more traffic than it does at present. The Harbour Trust has decided in principle, but subject to a survey of market potential, to construct a small roll-on/roll-off terminal at its Eastern Wharf. The scope for development at the Eastern Wharf is limited, and there is also a project to acquire and reclaim 18–20 acres of land at the Stannergate to the east of the existing Port area. The latter project would enable the Trust to construct new berths with the quay space necessary for handling unitised cargo, whether it be in the form of containers or roll-on/roll-off trailers.

42. It is difficult to foresee major developments for ports such as Dundee, given national policies for ports, present trends in sea transport (containerisation, the construction of large bulk carriers, the centralisation of major flows) and the fact that cargo for Europe is usually moved by the shortest sea route. The estuary could be made suitable for large bulk carriers only by extensive dredging, and would involve the acquisition and development of land on the estuary for additional berthing and handling as well as the location of a user or users of bulk imputs in close proximity to these facilities. There are possibilities at Barry/Buddon and at Tentsmuir but both of these sites have other important potential uses, Buddon as an area for recreation and Tentsmuir as an area of scientific interest, forestry, and recreation. Moreover, the exploitation of either or both of these sites would be expensive and would, in our opinion, have to be justified in a national context. We note that Tentsmuir was included in the 10 sites recently suggested as possible locations for 'maritime industrial development areas' (MIDAS).

43. So far as general dry cargo is concerned, the improving transport links between Tayside and the Forth and Clyde ports seem likely to make it easier for the Region to use these ports. Because of this and the national arrangements that are being made for container services we do not see it necessary to require major port developments at Dundee as a pre-requisite for the envisaged development of Tayside. We recognise however, that there may be individual projects, justifiable economically, that it may be advantageous to undertake in the years ahead. These are matters for the Harbour Trust and potential users, to consider in the light of the circumstances of the time. While we are not convinced that a sufficient case can be made out at present for the development of a roll-on/roll-off service, we think it reasonable to reserve for the Harbour Trust, at least for some years, the site at the Stannergate that they might use for this purpose.

AIR TRANSPORT

44. Dundee was not included in the post-war network of Scottish air services. However, since 1960, several

operators have tried to run services from the area to Glasgow and London but with the exception of B.U.A., which provides surface transport between Dundee and Turnhouse, none of these services has been maintained. According to the operators, demand and the financial support made available against their deficits have been inadequate. In examining air services from the Region we considered possible locations for a regional airport and its economic viability.

45. Eight sites were considered as possible locations for a civil airport –

1. Leuchars, Fife
2. Riverside, Dundee
3. Scone, Perth
4. H.M.S. Condor, Arbroath
5. Tealing, North of Dundee
6. Easthaven, between Dundee and Arbroath
7. Errol, between Dundee and Perth
8. Buddon Ness, between Dundee and Carnoustie.

Of these only Buddon Ness has not been used previously as an airfield and it was assumed therefore that, with this exception, none possessed severe disabilities, such as ground conditions or climate, that could limit its use by aircraft. The sites were considered individually using the following criteria.

a. Present ownership (indicating availability)
b. Present use (including agricultural value)
c. Present surroundings (operating difficulties, blight-ing effects)
d. Present condition (buildings, surfaces)
e. Length of runways
f. Altitude and orientation
g. Principal towns and total population within 10 miles
h. Potential population within 10 miles
i. Distance from main roads
j. Distance from railway station

These criteria gave Buddon, Leuchars, and Errol as the best locations. Buddon is proposed for other uses in the Study. Leuchars is one of the most important R.A.F. stations in the U.K., and the Ministry of Defence (Air) have stated that they are not prepared to agree to any growth in civil air services beyond the four movements a day granted to Autair in 1967. Assuming that restrictions on Leuchars would continue indefinitely, only Errol remained. Moreover, Errol has an advantage over Leuchars in that it is more accessible to Perth and the western part of the Tayside Region.

46. Errol is a disused R.A.F. station which was sold some 10 years ago for agricultural use. It had three runways, the longest measuring 4,700 feet. Rail and road communications with Dundee and Perth are good and of the sites studied it has the largest catchment of existing population. In the circumstances Errol seems to be the best site for a regional airport, given the restricted availability of Leuchars.

47. The development of an airport at Errol, at the present time, would not be an economic proposition. The capital cost of development to a standard adequate for aircraft commonly used on domestic trunk routes, such as the Viscount and Vanguard, would be in excess of £750,000 at 1969 prices. Running costs, estimated on the basis of data for other airports, might be in excess of £200,000 a year. We cannot see that the demand for air transport from the Region in the foreseeable future would justify these expenditures.

48. Demand from the general area has been estimated at about 15,000 terminal passengers a year. This covers domestic travel to and from London and some tourist traffic. Autair, in the period 1967–69, had about 3,000 terminal passengers a year and B.U.A., using surface transport between Dundee and Turnhouse, were carrying about 2,000 a year. The figure of 15,000 takes account of passengers using lines other than Autair and B.U.A. (Turnhouse). Comparable figures for 1967 are 600,000 terminal passengers at Edinburgh, 104,000 at Aberdeen, and 340,000 at Newcastle.

49. Even with an aircraft such as the Viscount 800, operating at an average load factor of 60%, the number of movements required to deal with 15,000 terminal passengers a year would be well below what is now available at Leuchars. However, for the purpose of this exercise we might assume that a Viscount 800 service began in 1970 with 15,000 terminal passenger a year which is unlikely since some passengers would still choose to travel to and from Edinburgh and Glasgow and grew at about the rates predicted for domestic traffic in the *Report on British Air Transport in the Seventies* (Cmnd. 4018). On these assumptions, and given four movements a day and a 60% average load factor, total demand in 1980 would seem to be less than 70% of the number that could potentially move through Leuchars each year. Moreover, use of an aircraft with greater seating capacity than the Viscount would increase the potential capacity of the service. We conclude that, on the basis of the present availibility of Leuchars, neither present nor substantially increased demand from Tayside would justify the expenditures involved in developing and operating Errol.

50. The demand for air transport in Tayside can, in the years immediately ahead, be met, virtually entirely, by the use of Leuchars and Turnhouse. Executive jets and small charter aircraft could use Scone, if Riverside (Dundee) is transferred to another use. At present (January 1970) there is no air service, neglecting B.U.A.'s land link, from the Region. In the immediate future the only scheduled service from the Region seems likely to be a subsidised feeder service, using a small aircraft, between Leuchars and Glasgow. It is difficult to see that this will do much to create circumstances favourable to the establishment of a direct service to London. It is even more difficult to see that, for the next decade at least, any such direct service could not be adequately provided for at Leuchars. While we think it desirable that the possibilities of establishing a direct service to London should be fully examined by the Tayside local authorities when the re-organisation of civil aviation, following the *Edwards Report*, is more advanced, we recognise that the net benefit of such a service will be reduced as the road links between Tayside and Turnhouse improve. At present, using the scheduled road service run by B.U.A. between Dundee and Edinburgh, it takes 130 minutes between departure from

Dundee and take-off at Turnhouse. Actual travelling time by road can be appreciably less than 90 minutes.

51. We think it desirable that limited provision should be made for a time when there may be a case for a regional civil airport other than at Leuchars. Substantial and continuing expansion of population and industry, for example, will both increase the demand for air transport and the potential of the local authorities to provide financial assistance. To this end we suggest that the land necessary for a development at Errol should be reserved for this possible use until it is clear that other developments have rendered this unnecessary.

TRENDS IN TRANSPORT

52. No reliable estimate of future demand for, or supply of, transport was possible. A simple projection of past trends would be inadequate. For instance, the demand for freight transport will emerge in large measure from industries whose size, type and location are not known. In addition, any attempt to predict the division of demand and supply among modes encounters the difficulty that transport comprises a number of separate markets which overlap, *eg*, buses and cars, long distance road and rail, long distance rail and air. Competitions between modes in the overlapping areas will depend not only on costs (as reflected in prices) but also on such qualitative factors as speed, frequency and reliability. However some guidelines can be indicated.

53. There is the trend towards unit handling, especially containerisation, which integrates the diverse components of the transport industry into one unified system. Containers can be moved rapidly using some or all of road, rail, water and air transport. Containerisation is spreading much more rapidly than might have been forecast a year or so ago, and its use in Tayside may be stimulated by the provision of a freightliner terminal in Dundee.

54. It is forecast that road haulage will play an increasingly important role in the movement of freight [1]. This underlines the importance of providing Tayside with a good road network.

55. Private car ownership will continue to increase, thereby adding to the difficulties of providing profitable services for those who will continue to depend on public transport.

CONCLUDING REMARKS

56. The requirements for a Tayside transport system conducive to the scale of growth envisaged are summarised below.

Internal Tayside movements

a. Solutions to the problems of traffic congestion in Dundee and Perth. A study of Dundee is in hand, and will take account of our proposed population distributions (Dundee Land-Use Transportation Study by Messrs Freeman Fox). A study of Perth is nearing completion (Perth Case Study by the Scottish Development Department).

b. Provision of adequate roads for goods transport, buses and passenger cars. Our analysis and conclusions are given in Chapter 22 on Roads and Traffic.

c. Maintenance of adequate bus services especially in rural areas. The 1968 Transport Act provides a framework within which policies to rationalise present services can be devised and experiments undertaken. In particular provision is made for local authorities to make grants to support unprofitable but socially desirable services.

d. Maintenance of the railway lines Perth–Dundee–Arbroath–Montrose, and (at least) Ladybank – Cupar – Leuchars – Dundee for internal passenger services (see also (h) below).

Internal UK movements

e. Provision of adequate road links with the UK network. This is discussed in Chapter 22.

f. Provision of an adequate freightliner service from Dundee. We envisage a full freightliner depot, not necessarily in the area of the Tay Bridge Railway Station, when it is justified by the traffic potential. This should replace the mini-depot which we expect to see established within the next few years. A site or sites for these depots should be selected taking into consideration our proposed industrial development areas as well as the distribution of existing industry.

g. The provision of a direct passenger air service from Leuchars to London, with additional limited freight facilities. We regard this principally as a matter of organisation, we would envisage a subsidised service in the early years at least.

h. Maintenance of the railway lines Edinburgh–Dundee–Aberdeen (*via* the Forth and Tay rail bridges) and Glasgow–Perth–Dundee. We assume that the line Perth–Inverness will be maintained in any case.

International movements

i. Ready access to the Forth and Clyde Ports and to the container freight transport system. While we do not envisage major developments at the Port of Dundee as a necessary condition of growth, we recognise and would welcome improvements and developments by the Harbour Trust that are economically justifiable.

j. Ready access to international airports, notably Glasgow, Prestwick, and London, for passengers and freight.

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[1] See W. Beckerman and associates, Chapter 11, *The British Economy in 1975*, (C.U.P. 1966) and *The Transport Needs of Great Britain in the Next Twenty Years* (H.M.S.O., 1963).

Introduction

1. Part I of this report argues that a future city region in Tayside could evolve from the existing pattern of settlements. In order to reach this conclusion the existing settlements and districts were investigated. This third section of our report summarises these investigations, and in this Introduction we note the aims and methods adopted.

AIMS

2. A possible form for such a city region, with a population distribution for the year 2001, was suggested in the Appraisal, Chapter 2. The role and population assumed for each subdivision of the Region at the end of the century were compared with the local development potential. In this we were seeking those characteristics and features which would influence future changes and development. From this comparison, proposals and policies for each locality were formulated.

3. For this purpose we divide the Region into four general Areas and devote a chapter to each: (1) The Dundee Area – Chapter 24, (2) The Perth Area – Chapter 25, (3) The Areas containing the Burghs in the Core of the Region – Chapter 26, and (4) The Highland and Rural Areas of the Region subdivided into four areas – Chapter 27. The boundaries of these Areas are shown in Diagram 25.

4. In the Highland and Rural Areas, we were seeking those policies which would arrest decline while striking a balance between exploitation and conservation of resources and environment.

5. The other Areas were those selected for growth, and the analysis included an assessment of possible residential and industrial areas, the extension of public utilities, and the provision of educational and social buildings. The development of an efficient road system and the ability of commercial centres to cope with increases in demand and in traffic were also considered. The aim was to investigate whether growth could occur without congestion, while enhancing the inherent character of town or coutryside.

6. Assessment of the impact of growth on towns, and in particular on town centres, involves the analysis of an intricate set of relationships between many factors, one of which is the rate of growth that actually occurs. For example with relatively slow growth an existing centre may have time to adapt, redevelop and expand without congestion or loss of character. With relatively faster growth more fundamental and expensive surgery may be involved. Again the pace of development outside the town of roads, industry and commerce will also affect internal capacities.

7. In these investigations at local scale, we have evaluated the possibilities revealed by the local authorities in their existing plans and ideas. Beyond this we have restricted our investigations to the point of detail required to substantiate the general direction and feasibility of growth, and to check the validity of our strategy for the City Region.

8. We emphasise that our investigations and proposals do not supplant the need for joint discussion of a regional strategy by the local authorities. Further, more detailed work should follow within the framework that is agreed for the form, population and development of the Region. When this work is undertaken, the local authorities will have the advantage of our long-term view, which has been drawn up in a regional context without regard to the present administrative boundaries but with a joint programme of action in mind.

9. Matters for local decisions will include detailed development plans for each locality which will modify or fill in the broad structures we have suggested. From these, and from the agreed regional strategy, a selection of sites to be included in any five year building programme can be made. At each selection stage it will be particularly important to review traffic, parking and other capacities in central areas in relation to the rates of growth assumed and achieved.

METHODS

10. The procedures, to which the local investigations contributed, may be summarised as follows:

(1) The main objectives of regional development were set out and an outline given of the possible form and population distribution in the City Region in 2001 [Chapter 2].

(2) Local charcteristics and potential were noted as part of the analysis of particular topics [Part II].

(3) Statistical indices for each district, burgh and city were prepared, to provide a general comparative background.

(4) Further information on capacities and aspirations were gathered from visits to, and discussions with, local authorities and others.

(5) The outline suggestions made under (1) were investigated, in the light of (2) to (4), in relation to existing proposals, characteristics and constraints, and future potential of each locality. This involved a detailed physical survey and analysis of each area and a review of relevant economic criteria.

(6) Suggestions for the form and population distribution of the City Region were adjusted in the light of these local investigations.

(7) Following several stages in this iterative process, proposals and policies for each area

were formulated which would be in accord with both the regional strategy and the local analysis.

11. This detailed survey and analysis for each potential expansion area was carried out in four parts:— (1) Survey of the physical characteristics and capacities, (2) Physical analysis, (3) Appraisal of alternatives, and (4) Synthesis and selection of proposals.

12. (1) *Survey of Physical Characteristics and Capacities.* The physical survey at 2½" scale (1.25000) identified and mapped the following:—

- (a) *Gradients:* 1 in 5, 1 in 10, 1 in 20, 1 in 40; areas over 500 feet.
- (b) *Landscape features:* rivers, flat land, steep slopes, woodland, major and minor barriers.
- (c) *Agriculture:* Department of Agriculture 'A' and 'B+' classification; Macaulay Institute 1 and 2 classification.
- (d) *Geology and soils:* sand and gravel deposits; quarries, sand and gravel works; areas of poor drainage.

13. In addition the existing patterns and capacities were mapped after investigation of the following:—

- (a) major existing land uses (residential, industrial, central area etc);
- (b) major development plan proposals and amendments:
- (c) areas of landscape value and green belts;
- (d) major engineering thresholds and road capacities.

14. This work produced the basic information for each Area which was recorded on sieve maps. These have not been reproduced in the report for each Area since the detail and the quantity required to make them significant would have been unmanageable. However over 100 sieve maps were produced for the main Areas and these can be made available to local authorities.

15. *(2) Physical Analysis.* The sieve maps were analysed in the way demonstrated in Diagram 26 as follows:—

1. Physical suitability: areas particularly suitable for residential or industrial development were identified from the sieve maps.
2. Residential restraints: by contrast factors providing significant or modifiable restraints such as quarries and power lines were similarly identified.
3. Landscape analysis: the positive features of the landscape were identified, for example major and minor ridges, the areas defined by the existing landscape and major woodlands.
4. Development opportunities: a final analysis which brought together the possibilities and restraints indicated above and identified the residential and industrial opportunities.

16. *(3) Appraisal of Alternatives.* As a first step in the appraisal, a review was made of the historical development of each Area and the requirements that would arise if the population continued at its present level. The second stage represented the most important part of the work as it involved a review of the ways in which development could occur in the future, assuming that growth took place. This was achieved by reconciling in different ways the potentially conflicting elements revealed in the analysis. In this way different balances between the various restraints, objectives and locational criteria were studied and possible alternative directions of growth were produced. Sites common to several alternatives were also noted as an indication of where development could start while keeping open alternatives for future selection. In each area the alternatives were appraised in this way in relation to differing objectives, rates of growth, and implementation of other elements such as roads, recreation areas etc.

17. *(4) Synthesis and Selection.* From the previous stages in the investigation and from the review of economic criteria it was possible to arrive at the final synthesis and selection of proposals. In each chapter and for each Area, diagrams are given which demonstrate the proposals or, where appropriate, sketches indicate the general directions of growth that could be adopted.

18. The diagrams demonstrate the general areas or zones where development could take place for residential and industrial purposes. They also show the linking open spaces which should be secured for recreation, woodlands or horticultural purposes as an essential part of the urban fabric. On the diagrams we have called these areas 'greenscape'. Greenbelt policies as part of the regional context are referred to in Chapter 4.

19. The following chapters summarise the character and potential of each Area, where appropriate discuss alternatives, and set out our recommendations for the policies and proposals that should be considered for future development and growth in the Region.

24 The Dundee Area

CHARACTERISTICS AND POTENTIAL

1. The Dundee Expansion Area was defined for the purpose of this investigation to lie between the Sidlaws, Leuchars, Carnoustie and Inchture. The Area includes the City of Dundee, the small burghs of Carnoustie, Monifieth, Newport and Tayport, and a number of rural settlements. The total population of the Area is about 215,000, all of whom live within about 10 miles of the centre of Dundee.

2. The analysis of the future form of the City Region contained in Chapter 2 suggested that the centre of Dundee should be the focal point of the Region for many cultural and commercial activities. In addition, the initial economic appraisal proposed that a substantial part (nearly half) of the 2001 remit population increase should take place in the Dundee Area. This Chapter investigates the characteristics of the various parts of the Area, assesses their potential to fulfil the growth and city region role suggested, and recommends proposals and policies for future development.

3. The results of the studies of topography, geology, agriculture and landscape for the Dundee Area are set out in the following paragraphs. In general a contrast is revealed between the areas which lie to the north and south of the Tay.

4. The process of gradient analysis, applied to the area north of the Tay, emphasised the barrier to development imposed by the Sidlaws and drew attention to the major areas of flat land along the Carse of Gowrie, Buddon Ness and the coastal plain surrounding Carnoustie. In addition a number of smaller, but still significant, flat areas were identified, for example at Baldovie and at Tealing. South of the Tay the analysis revealed the much more broken nature of the topography with Tentsmuir as the only major area of flat land.

5. From an examination of the geology of the Area a number of areas unsuitable for development because of poor drainage, were defined. These included the Carse of Gowrie west of Longforgan and an area on the western edge of Tentsmuir extending from Leuchars almost to Tayport. Foundation problems may also be encountered in areas of blown sand at Buddon Ness and Tentsmuir. The main deposits of sands and gravels of commercial significance are located on the south side of the Tay astride the main railway line from Wormit to Leuchars. Apart from these areas the land is physically capable of development.

6. Again, in the case of agricultural land there is a contrast between the areas to the north and south of the Tay. Around Dundee there are extensive areas of 'A' class land (Department of Agriculture and Fisheries classification) stretching from the Carse through Invergowrie to Muirhead, and from Strathmartine by Monifieth to Carnoustie and beyond. Between Muirhead and Kirkton of Strathmartine there is an area of 'B+' land which stretches up into the Sidlaws. Buddon Ness is an area of very poor agricultural land. South of the Tay the pattern of 'A' class land is much more fragmented with small areas between Leuchars and Tayport together with an area in the Kilmany valley.

7. The landscape analysis on the north side of the Tay identified the visual significance of the Menzieshill area, the ridge just south of Muirhead, the escarpment along the southern edge of the Tealing basin, and the series of hills and ridges extending from Gallows Hill north of Monifieth to the Downie Hills near the Monikie Reservoir. Areas of differing character were also revealed, ranging from the flat sparsely tree covered carseland to south-facing well wooded slopes. North of Dundee the flat Tealing basin is an important landscape feature which is visually and physically separated from the existing urban area. A network of electricity pylon lines concentrate at a switch-gear station to the south of Kirkton of Tealing. West of Tealing the land form changes to a more gentle undulating character with increased tree cover; however the flat coastal strip north of Carnoustie is more open and exposed. South of the Tay a series of hills and ridges running for the most part parallel to the Firth create a number of small sheltered interlocked valleys. Tree cover in these valleys varies considerably and becomes a little sparser inland from the river. To the east the land opens up a little more culminating in the flat wooded expanse of Tentsmuir.

8. From the various factors examined in the physical analysis, three main areas of potential for urban development lying outside existing built-up areas can be identified: (1) to the west; (2) to the east and (3) to the south of Dundee. North of Dundee the potential is limited apart from a small area along the ridge at the southern edge of the Tealing basin. On the west, the valley extending from Rossie Hill to Liff Hospital comes out clearly with slightly less attractive areas to the north and south. To the east of the Forfar road there are some areas of limited opportunity but the most attractive area extends from near Monikie Reservoir eastwards along the south-facing slopes north of Carnoustie. Smaller areas of considerable potential occur immediately north of Monifieth and Carnoustie. On the south side of the Tay there are areas with very good opportunities for development; they are located a mile to two miles inland and stretch from Wormit to Tayport.

DUNDEE

9. *Environment and land use structure.* On south-facing slopes backed by the Sidlaw Hills, containing the Law Hill and Balgay Hill, and overlooking the broad Firth of Tay, Dundee stands on one of the finest town

sites in Britain (See Plate 1). The topography has greatly influenced the form of the City. The site has long been occupied by an urban settlement and although the architectural traces of this are very few, the central area street pattern survives from the Middle Ages. Much of the inner part of the City defined by the Law Hill and Baxter Park bears the marks of very rapid population growth in the nineteenth century; between 1871 and 1891 the population grew by over 34,000 with densely developed four-storey tenements and textile works built in close juxtaposition. A similar pattern of development also took place around Lochee while villa development occurred in Broughty Ferry and on the Perth Road. Although much redevelopment has taken place, the nineteenth century and early twentieth century residential pattern remains. Between the wars local authority housing development and private enterprise housing filled in the gaps between the inner city and the outlying villa development. This largely took place in the area to the south of the Kingsway. Between 1939 and 1989 the built-up area of the city grew by 66% and development of extensive local authority housing estates spread beyond the Kingsway. Industrial estates, begun before the war, have been extended along the Kingsway.

10. Dundee, as a whole, is well provided with public open space. However in the central area, as defined by the line of the proposed inner ring road, there is a deficiency which should be made good in the course of future redevelopment.

11. *Population.* Between 1931 and 1951 when the population was 177,300 there was very little change, but from 1951 to 1961 the population grew slowly to 183,000. In 1966 the estimated population was 183,700. If recent trends persist, the population of Dundee will continue to rise in the very short-term. However, the increasing rate of net emigration could exceed the natural increase and produce a decline in population by 1981.

12. *Employment and Industry.* The general employment situation in 1966 in Dundee was as follows.

(a)	Number of people living and working in Dundee	84,910
(b)	Number of people living in Dundee, working elsewhere	2,360
(c)	Total resident working population (a + b)	87,270
(d)	Number of people working in Dundee, resident elsewhere	7,780
(e)	Total number of people working in Dundee (a + d)	92,690

13. These figures illustrate Dundee's importance as an employment centre, with about 45 per cent of all employment in Tayside. In addition it is a relatively self-contained employment centre; only 2,360 or 3% of the resident working population work outside the City compared for example with Perth where the figures are 2,460 or 14%. Moreover 2,900 or 37% of the 7,780 people who commute into Dundee City live within 5 miles of the city centre.

14. Although there have been considerable changes since 1945, Dundee is still very dependent on manufacturing industry in general and textiles in particular; there is a high proportion of female employees in industry. Over 300 acres of land allocated on the City Development Plan for industrial use remain undeveloped. About two-thirds of this is located on the east side of Dundee. Although redevelopment will produce some industrial land within the City, Chapter 18, (Redevelopment and Displacement), indicates that 700 acres of land will be required, even without growth of population, because of changes in industrial structure and other factors.

15. There has been an increase in office employment in recent years which has been mainly associated with the growth of professional services. If this trend continues it will place increasing demands for floor space in the central area of Dundee; the assessment of the potential for meeting this demand involves other central area functions and will be considered in paragraph 27.

16. *Housing.* Between 1931 and 1947 in a period of practically no population growth there was an 11 per cent increase in the number of dwellings. By 1968 when the population had increased slightly, the number of houses built after 1945 represented 37 per cent of the total housing stock. This is an impressive record. Between 1964 and 1966 the average annual rate of house construction was 1,150 of which about 22 per cent were built for private ownership; nevertheless by 1966 only 19 per cent of all households in Dundee consisted of privately owned dwellings. In the period 1966 to 1971, the annual average house-building rate is programmed at 2,250 and this rate was in fact exceeded in 1967 and 1968 when a total of 5,065 houses were completed.

17. As a measure of overcrowding, the proportion of households living at over one person per room in 1961 (30 per cent) was the highest in the region and the highest but one (19 per cent) in 1966. In terms of households with all basic amenities the proportion in 1961 was 59 per cent and in 1966, 66 per cent. In 1964 it was estimated that 15,600 houses or about one-quarter of the housing stock were unfit. Looking to the longer-term, it is estimated that 23,500 houses will require replacement between 1971 and 2001 and about two-thirds of the displaced population will require new housing sites. Over the same period, assuming a continuation of the 1966 population level, it is estimated that 5,700 households, also requiring new housing sites, will be formed. These elements will give rise to a demand for 21,000 houses on 1,870 acres of new residential land. (See also Chapter 18, Redevelopment and Displacement).

18. The 1964 Dundee City Development Plan with subsequent amendments, allocated land on which 17,800 houses could be built, from 1966 onwards. By 1971 some 11,700 will have been constructed on this land if the current building programme is maintained. In the estimation of the City this would leave space for 8,100 houses after 1971. Allowances must however be made for the gradual achievement of the lower densities suggested in Chapter 3, and it is therefore suggested that some 5,000 houses for 15,000 people should be regarded

as the remaining residential capacity within the Development Plan which will be available during the first phase (1971–81) considered in this Report.

19. *Water Supply.* The main water supply for Dundee comes principally from the Loch of Lintrathen which also supplies north-east Fife by mains carried by the Tay road and rail bridges. The construction of the Back Water Dam has increased the capacity output of the Lintrathan complex from 13 to 22 million gallons a day. At present levels of consumption this would support a population of some 315,000, an increase of about 100,000 people in the Area, assuming a consumption of 70 gallons per person per day. But assuming that consumption, including industrial, will increase to 90 gallons per person per day then this would be capacity for only 245,000 people. However additional projects (see Chapter 21, Engineering Services) could give the complex a capacity of 55 million gallons per day which could serve a total population of 600,000 people, that is an increase of 395,000 people.

20. *Drainage.* At the Lochee Burn and the Dighty Water, and between these limits, sewage is discharged untreated through some 36 major outfalls in the 36 to 48 inch diameter size and through numerous small ones. For trunk sewers leading to the outfalls there is broadly speaking no spare capacity and in particular use of the Dighty sewer is approaching full capacity. Before a general sewerage scheme can be undertaken, a comprehensive study will be required. This will be necessary whether or not there is population growth.

21. The restraints imposed by the present sewerage system and the possibilities inherent in a scheme for a new system (see Chapter 21) have been taken into account in drawing up development proposals.

22. *Other Public Utilities.* The supply of gas and electricity and the provision of postal, telephone and other services do not place any constraints on growth in the area.

23. *Educational Facilities.* Of the 48 primary schools in Dundee many are housed in old and inadequate buildings. 29 schools have however been built since 1945, mainly in new residential areas and they accommodate two-thirds of the primary school children. Four new secondary schools planned for early construction are unlikely to have any significant spare capacity for population growth. Of the existing schools there is no significant or suitable spare capacity. There is one fee-paying secondary school which also has a primary department and it too has no spare capacity at present.

24. Facilities for higher education in Dundee are offered by the University, Dundee College of Education, Dundee College of Technology, Duncan of Jordanstone College of Art, Kingsway Technical College, Dundee College of Commerce; the number of students attending these institutions is expected to increase in the 1970s.

25. *Cultural, Community and other Facilities.* Deficiences in these facilities in the Area include the absence of any suitable building for operatic performances and the antiquated swimming baths. The repertory theatre, housed in a converted church is some distance from the city centre. The development of the landfall area of the Tay Road Bridge, including in particular a new swimming bath would improve the situation.

26. Libraries, museums and local community centres are particularly successful local institutions but would require expansion if major population growth took place. Some forms of commercial indoor recreation including cinemas could cope with an increased demand. However the present level of indoor sporting facilities would not meet potential demand. Outdoor recreation for spectators and participants include two first division football grounds, yachting and golf. The Area has capacity to expand these facilities and to provide a wider range of activities.

27. *Central Area and Commercial Facilities.* The central area of Dundee contains the largest shopping centre in the region and in 1961 conducted 50% of the City's retail turnover. The redevelopment of the Overgate will increase the available shopping floor space and could support a larger population. Substantial office capacity is being built into the redevelopment schemes. Other important employers, including manufacturing industry and warehousing, already exist in the central area. Civic and cultural facilities are also located in the central area and it is planned that more should be added. From the point of view of the provision of space, it is clear that Dundee's central area is capable of serving an increased population..

28. Regional strategy, however, suggests that over the next 30 years Dundee could become a supra-regional centre serving 750,000 people and a city centre for perhaps twice the present population of Dundee. For this to be effective the central area will have to be capable of providing not only adequate floor space for the future population but also appropriate road and parking space so that congestion and uneconomic redevelopment can be avoided. The existence within, or close to, the central area of unused land, such as former railway goods yards, and the incidence of warehousing and some other uses, which could be relocated, suggest that there are opportunities for reshaping and restructuring the central area. Although a firm answer to the problem must come from more detailed land use and transport investigations, it appears that the central area could have the potential to perform an expanded city and regional role; and it could do so if suitable policies can be drawn up and operated.

29. *Roads and Transport.* To include a detailed land use/transportation study for the City and the surrounding area as part of this Study would have been premature or would have prolonged it by a year. The information provided by this Report concerning the Regional setting of the City, its size and roll are all required together with the population and employment patterns, before a land use/transportation study can proceed beyond the survey stage. The Dundee Area Land Use/Transportation Study started during the course of the Tayside Study and it will be completed by mid 1971.

30. With regard to the traffic conditions in the central area, the greatest influence will be exercised by the capacity of the proposed inner ring road related to parking and traffic management policies. Its capacity will also be affected by the Tay Bridge and by the direct access of the harbour, the railway station, the bus station and other major traffic generators.

31. The other main elements of Dundee's road system are the radial roads and Kingsway. One radial, the Tay Road Bridge, is of particular importance for potential expansion in the area on the south of the Tay. We note in paragraph 6B the particular attractions of the area in the vicinity of Newport and Tayport for further residential development. The amount of this development will be limited by the capacity of the present bridge to take the traffic generated, unless abnormal development costs of bridge widening and access roads or a new bridge are to be contemplated. We found, using the assumptions set out in the appendix to Chapter 22, that traffic generated by a total population of approximately 50,000 living within three miles of the southern end of the Tay Road Bridge, could be carried on the bridge before further construction work would be necessary. If the assumptions used are modified as development occurs, particularly with regard to the location of employment south of the river, then the population capacity in the area would also change. This suggests a cautious approach to the programming and type of development in the Newport–Tayport area, particularly in the initial stages.

32. The Kingsway has considerable spare capacity which could be increased by special measures at junctions with the main radial roads. The capacities of the other main radials vary considerably. Generally those on the west have the greatest potential for carrying more traffic but there are considerable problems as the city centre is approached along the Perth Road; the greatest unused capacity is along Riverside Drive. Apart from getting on to the Arbroath Road there is capacity on the radials to the east which could be increased beyond the junction with the Kingsway. Because of topography, the most difficult roads to improve are those from the centre to the North, particularly Lochee and the Forfar Road. This suggests that initially development to the east, west or south would be easier.

33. The 1966 Sample Census shows that, of the B5,000 people living and working in Dundee, about 50% travel to work by bus. This proportion may be expected to decrease with increasing car ownership and use, but to the shopper, the elderly and to schoolchildren, bus services will continue to be a vital service for the foreseeable future. The inevitable limitations of road and parking space particularly in the central area will mean that bus services will continue to be important for travel to work.

34. *Summary.* The major problem has been to assess in a general way appropriate to a regional plan, the constraints which could be imposed on the development of the Area by Dundee itself. The constraints are of two main types. The first are those associated with the provision of engineering services and with land demands generated by redevelopment and changes in the industrial structure. These have been examined in some detail. The second type concerns the function of the central area and the road system in relation to the City Region and these are the subject of policies and proposals. In general therefore the city of Dundee displays potential for change and for redevelopment and also provides a basis for growth in the Area.

Carnoustie

35. Carnoustie Small Burgh is situated 11 miles to the east of Dundee on a south-facing site with an attractive beach extending to Buddon Ness in the west and with fine views from the slopes at the back of the town looking out over the North Sea. The town is surrounded by good agricultural land which reaches very high quality on the east side.

36. Although there are about 500 jobs in manufacturing industries in Carnoustie and service employment provides about 900 jobs, 44% of the working population has jobs outside the burgh. Eight acres of land are allocated for industrial use on the development Plan. There are important dormitory and recreational roles played by the town which grew comparatively slowly to reach a population of over 5,000 in 1966. Housing conditions are good by present standards and it is estimated that only 150 houses will require replacement between 1971 and 1981. Land is not allocated for the displacement need on the county development plan. A new secondary school is to be completed by 1972; it will have some spare capacity which may be taken up by the closure of other schools.

37. Water supply in Carnoustie is adequate for the present demand and could be augmented if necessary. Much of the sewerage system has been constructed in recent years and could with the aid of pumping allow the buit-up area of the town to be expanded within the burgh boundaries. If expansion took place beyond the boundary a new trunk sewer would be required. On drainage grounds the preferred direction of growth would be to the north by the Lochty Burn.

38. The golf courses of Carnoustie are of outstanding importance to the recreational role of the town. They are used to full capacity at certain periods of the year and an additional course is sought by the community. Land is not at present available on Buddon Ness for this purpose. Carnoustie has a good range of other recreational facilities and the Burgh Council has contemplated providing an indoor swimming pool.

39. Carnoustie is by-passed by the A92 Dundee to Arbroath road but it has some localised traffic problems. The main shopping centre is on a rather narrow street which is also the main road through the town and this causes congestion; traffic management and off-street car parking have eased this problem but additional measures will be required if the town and its recreational function are expanded. Such expansion will mean that the access under the railway between the town and the beach or golf courses should be improved.

Monifieth

40. Monifieth is a Small Burgh located immediately to the east of Dundee and has site characteristics similar to Carnoustie. The space between the rising ground on the north side of the town and the coast is somewhat narrow and gives the town an elongated form. The Burgh is also surrounded by good agricultural land except on the south-east side at the junction with Buddon Ness.

41. Owing to a high rate of immigration and to natural increase the population of Monifieth has been growing in recent years and in 1966 reached about 4,000 people. This growth has been based on the rapid development of a dormitory function. About two thirds of the employed resident population work outside the Burgh, 95 per cent of them working in Dundee. However there is also substantial employment in Monifieth itself, the employed labour force being about 1,300 including one third in manufacturing industry. The daily inflow of workers is about 660. There is very little land allocated for industrial use in the Development Plan.

42. Housing standards are high in Monifieth because over half of the houses have been built since the war. In recent years about three-quarters of new houses have been built for owner-occupiers. It is estimated that between 1971 and 1981 only about 50 houses will have to be replaced and there are about 10 acres of land for this and for other local authority housing short-term needs. There are also about 50 acres of land for private housing development on which construction has started. A site is reserved for a new primary school.

43. Water supply is part of the Dundee City reticulation and could be augmented to meet an increased demand. Sewage disposal at present is by means of an outfall and a pumping station, the sewage being untreated. The trunk sewer system is adequate for the present population but expansion, especially to the north, would necessitate major capital outlay.

44. Monifieth has two golf courses to the east and other facilities for visitors and holidaymakers including small hotels and a site for 160 caravans. There is a small shopping centre which lies on the main road, A930, through the town. Parking restrictions have recently been introduced but the amount of car parking directly off the main road is limited; there are adequate car parks to the south. The problem of creating a by-pass for through traffic travelling to the east is difficult because the main shopping street is flanked by residential areas.

Tayport

45. Tayport lies on the south shore of the Firth of Tay at its narrowest point and enjoys fine views of Angus to the north-east. The northern part of the town is limited in the west by Spears Hill which rises fairly steeply but in the south the land is more open and flatter, particularly in the direction of Tentsmuir. The oldest part of the town, around the harbour, is attractive and picturesque with narrow winding streets. This is surrounded by a more formal street pattern with nineteenth century villas, cottages and terrace housing. Local authority housing is located on the southern edge of the town. With a golf course and three commons there is adequate open space in Tayport.

46. The population of Tayport has been declining slightly in recent years and was about 3,000 in 1966. Although there are jute works and a timber industry based on the harbour in Tayport, and a range of service industries, over half of the employed resident population of 1,400 work outside the Burgh. The Tay Road Bridge may have increased the number of people choosing to live in Tayport and work elsewhere. There are only five acres of land allocated for immediate industrial use in the Development Plan, but we understand that an amendment for 30 acres is being prepared.

47. The number of houses built in Tayport in recent years has been small and there is an appreciable housing problem. At the present time housing improvements rather than development are under way but it is estimated that between 1971 and 1981 100 houses will require replacement. Ten acres have been allocated in the Development Plan for residential use and are intended for private housing.

48. Water supply is adequate and could be considerably increased because of the 24" main incorporated in the Tay road bridge. This main could provide water for 75,000 people in north Fife. Considerable improvements to the whole sewage disposal system would be necessary before expansion in the Tayport area could take place.

49. Tayport has a range of commercial, cultural and other facilities that are adequate to satisfy local needs; they could also cater for some expansion although shopping provision would have to be increased for large scale expansion. The shopping area is not on the main through road so that access and car parking can be developed. A number of improvements to the present road system are necessary to ease traffic and to benefit the environment.

Newport-on-Tay

50. The small Burgh of Newport-on-Tay stretches 2½ miles west from the southern end of the Tay road bridge through Woodhaven to the southern end of the Tay rail bridge at Wormit. It is built on steep slopes and enjoys fine views to the north and west. The town has a verdant well-wooded setting and lies below the skyline when viewed from the north shore of the Tay.

51. Population was at the same level, 3,400, in 1951 and 1966 but it has been increasing in recent years. Growth has resulted mainly from immigration and, because of the Tay Road Bridge, is likely to increase. The present population has a very high proportion, 31%, of professional, managerial etc. socio-economic groups. This reflects the role of Newport as a dormitory town; 74% of the employed resident population work outside the Burgh. Future immigration is likely to reinforce Newport's residential dormitory function.

52. Housing standards are very high in Newport and 65% of the dwellings are owner-occupied, the highest proportion in the Tayside Region. It is estimated that between 1971 and 1981 50 houses will have to be replaced; the 3 acres required for the consequent displacement can be easily catered for on sites to be allocated in the revised Development Plan for the Burgh which will allocate land for almost 1,000 houses.

53. Water supply is adequate and can be augmented from the 24" main across the road bridge. Effluent at present is discharged untreated into the Tay where the large volume of water deals with the pollution load.

54. Newport is relatively well endowed with commercial and community facilities. Local shopping provision is adequate, but owing to the dispersed form of the Burgh transport to the centre is necessary. Increase in car ownership and population expansion will increase demand for parking space.

55. The construction of the Tay Road Bridge and its approach road has by-passed Newport but the B946 which runs the whole length of the Burgh is flanked by development for almost its entire length and owing to the topography follows a tortuous route. If Newport is expanded as proposed by the amendment to the Development Plan, additional traffic would have to use this road and this would be detrimental to the environment of the existing residential areas. An alternative road, without frontage development and with limited access, running parallel to the B946 from Wormit to the bridge access road would be of benefit to the town.

56. *Summary.* The four Small Burghs are located on sites which are attractive for residential growth. However their structure and their drainage and road systems limit the scale of expansion, especially in the first phase. They possess many useful community and recreational facilities which will be the basis for their role as local centres within the Region.

Other Settlements in the Area

57. In addition to the City, small burghs and scattered rural population, there are a dozen villages and smaller settlements in the area. A number, Longforgan, Gauldry and Muirhead for example, have partly become dormitory settlements for Dundee. Together with the other settlements they have potential for small scale expansion.

PROPOSALS

(See Diagram 27)

58. In the Appraisal (Chapter 2) the scale of expansion suggested initially for the Dundee Area was around 145,000 additional people. This figure was allied to the proposed role of Dundee as the major centre within the expanded city region but was modified as a result of detailed local studies.

59. Apart from new population, land had also to be provided for the estimated demands of housing redevelopment and changes in household structure over the period 1971 to 2001. These demands were calculated to be equivalent to the space needs of 56,000 people. It was assumed that the displaced population should have the opportunity of living as near as possible to their original place of residence. While it appeared that this objective could be met for the small burghs of Monifieth, Carnoustie, Tayport and Newport the scale of the problem is much greater for Dundee and a wider distribution of population may be necessary.

60. The investigation into the capacity for expansion took into account the regional functions that Dundee would need to fulfil as well as the long term nature of the proposals. Short-term development would not only need to be within a framework which allowed scope for change when the plan came to be reviewed but would also need to be related to the present day limitations and potential of Dundee City.

61. Outside Dundee and the four small burghs the investigations into capacity for expansion revealed that there were opportunities to the west, to the east and to the south of Dundee but only limited potential to the north. One of our objectives, the conservation of good agricultural land, had to be modified otherwise the capacity of the area would have been much more limited.

62. In arriving at the capacities of the various areas by the process of survey, analysis and synthesis, the relationship between proposed land uses and generated traffic was closely considered. Our proposals for new residential areas are aimed at providing living conditions which would allow access to local facilities within a few minutes walk, access to open countryside within half a mile and access to district shops, secondary school and employment centre within 20 minutes travelling time.

63. The studies showed that some 166,000 people could be located in and adjacent to Dundee and the four small burghs. Since the demands of redevelopment and changes in household structure had to be met first the capacity for new population was around 110,000. A distribution of new residential and industrial areas, together with road networks and district centres is shown on Diagram 27.

64. West of Dundee the analysis revealed residential and industrial opportunities in a sheltered valley visually screened from, yet readily accessible to, the main western approach road to Dundee, the A.85. Diagram 27 shows how the area could provide for some 18,000 people together with a district centre and two industrial sites totalling 325 acres. A spine distributor road would provide good access to the centre of Dundee as well as to the industrial areas along the Kingsway.

65. In the Muirhead area, north-west of Dundee, there are limited opportunities for development. Restraints include servicing difficulties, which will be modified when the Dighty water drainage scheme is completed, and the problem of intruding on the skyline which limits any development south of the A.923 Coupar Angus road. A further difficulty is the problem of access to the centre of Dundee (see para. 32) There is capacity for about 10,000 people although the servicing and traffic problems suggest that development in this area should be carefully assessed in later reviews.

66. To the north of the City in the Tealing area there are opportunities for industrial development but the

scope for residential development is limited. Building in this area would mar the present dramatic contrast between urban and rural land use as well as being exposed and difficult to screen. The lack of spare capacity on the northern radial routes into the centre of Dundee also acts as a constraint.

67. East of Dundee the studies indicated considerable opportunities, particularly along the south-facing slopes, offering both shelter and extensive views across the estuary. The development shown on the diagram stretches in an arc from Monifieth northwards towards Monikie Reservoir and then south to Carnoustie. The area could be linked to Dundee by a network of three parallel roads with the central road, the A.92, dealing with regional traffic. The area could accommodate approximately 77,000 people and there are four industrial sites totalling 780 acres. The western end of this development includes the Baldovie industrial site defined on the present Dundee Development Plan. The area could be served by the two district centres shown on the diagram. The centre north of Carnoustie could, with a link to the regional road network, act as the out of town shopping centre suggested in Chapter 16. Between Monifieth and Carnoustie the land is comparatively flat and of very high agricultural quality. In the area bounded to the north by the A.92 and to the south by the A.930 there is potential for large scale intensive market gardening. Immediately north of the A.92 the lack of tree cover could be overcome by the advance planting of shelter belts and a policy aimed at selective improvement to the existing landscape. Access from the development to open countryside is readily available to the north while to the south, if our proposal to turn the Buddon Ness site into a major recreational area is taken up, it will bring a large range of sporting facilities close to hand. (See Chapter 10, Recreation and Tourism). East of Carnoustie lies the Easthaven area which offers considerable potential as a large scale industrial site. Although the development between Dundee and Carnoustie is capable of many different forms related to rate of growth and successive programmes, two particular policies are proposed in this area. Development should not be continuous and should allow for 'greenscape' open space around and between the new residential communities whether for recreation or for market gardening as mentioned. Secondly, a 'stop line' for residential development should be set up east of Carnoustie, associated with the topographical features and woodlands bordering the A.958 Forfar road. This policy would allow the land in the vicinity of Easthaven to be available for major industrial uses, which require to be separated from residential development, or for continued agricultural production. In addition a clear definition would be set to the built-up area of our development proposals.

68. South of the Tay the proposals take advantage of a sheltered group of valleys extending from Tayport to St Fort and then west to Wormit. The existing urban areas and the new development could be readily served by linking the present distributor roads, with a by-pass at Tayport, to form a circuit allowing ready access to the Tay Road Bridge. Studies indicated that given certain assumptions (see Appendix Chapter 22) the bridge could carry the traffic generated by up to 50,000 people in the bridgehead area. This figure could be increased if there were more job opportunities on the south bank of the Tay. The supply of water presents no immediate problems since the existing main could supply up to 75,000 people. The drawing shows how, including expansion of Tayport and Newport, a total of some 40,000 additional people could be accommodated immediately south of the Tay. 350 acres of land suitable for industrial development are also indicated. The existing woodlands, bounded by the present and new urban areas, would form the basis of an eventual open space corridor or 'greenscape' along the tops of the steep slopes immediately south of the Tay. The studies also revealed the long-term residential potential of the Kilmany area to the south west. This is referred to in paragraphs 92 and 93.

69. In many of the small villages within the Dundee Area there is potential for small scale infilling and expansion. It has been assumed that around 6,000 people could be accommodated in this manner. This type of development would need to be carefully controlled to make sure that the present scale and charm of the settlements are not impaired.

70. The preceding paragraphs show that the Area could provide for 28,000 people to the west, 77,000 to the east and 40,000 to the south while some 6,000 would be accommodated by expansion and infilling of existing villages. In addition there is land for housing some 15,000 people allocated on the present Dundee Development Plan (see para 18) and we recommend that this should be taken up. In total these proposals provide for an additional population of 110,000 as well as a displaced population of 56,000.

POLICIES

Dundee City

71. Clearly such development would place certain pressures on the existing city services and facilities. In paras. 27 and 28 the problems and potential of the central area are examined in the light of a regional population of 750,000. As well as catering for these regional functions the City would also need to provide central area facilities for the expanded population of some 325,000 persons in the immediate hinterland. In the light of our investigations we recommend the following policies.

72. *Redevelopment and Housing.* Improvement of the image of Dundee is an essential part of the development of the whole City Region. Future policies, therefore, must include the redevelopment and rehabilitation of the whole urban fabric. In particular we have shown that over the next 30 years some 23,500 houses will become substandard and will require replacement. The quantity of land, about 1,400 acres, that we propose should be set aside for this redevelopment programme should allow a high quality of environment with the density standards set out in Chapter 3, (Constraints and Standards). The land at present undeveloped within the current Dundee Development Plan should provide in the short-term a basis for continuation of the redevelopment programme.

73. *Central Area.* At the moment opportunities for reshaping and restructuring the central area exist. This flexibility is a valuable asset in any modern city which aspires to growth. Future changes of use should therefore be closely allied to the regional role we have set out for Dundee. Existing uses, not essential to the city centre, should be encouraged to move to appropriate locations. In some cases this could be to an industrial estate, in others to an upgraded or new district centre.

74. *Shopping.* Specific policies for shopping are set out in the appendix to Chapter 16. In summary this suggests that careful consideration should be given to the timing of further development of shopping in the Central Area in relation to the creation of strong district shopping centres.

75. *Transport.* From a regional standpoint the proposals for the Area take into account an analysis of the impact of the increase in traffic on the city road system, in particular on the capacity of the radial roads. In this connection the level of employment and of car parking provision particularly for commuters, will be crucial in maintaining efficient traffic flows at peak hours. From our investigations, we consider that the city road system could be modified to accommodate the traffic generated by the additional population envisaged by 2001. The detailed policies to be adopted to secure this and in particular to reconcile the demands for building space in the city centre, must be based on the results of the Dundee Area Land Use Transportation Study.

The Area

76. In addition to the policies outlined for Dundee City there are a number of general policies related to the Dundee Area that we would recommend.

77. *Population.* The original proposition that an additional 145,000 people should be accommodated in the Area which already houses some 215,000 people, is set out in the economic appraisal (Chapter 2). In the light of subsequent physical and economic analysis, it was found that the area could provide for approximately 166,000 people of which only 110,000 would be additional. The remaining 56,000 would include people displaced from their homes through demolition and would also allow for the formation of new households. If the goals and assumptions set out in Chapter 2 are to be achieved then we recommend that the total population in the Dundee Area should be around 325,000. This figure although not quite as high as originally envisaged will still allow Dundee to fulfil the regional role and functions allocated to it.

78. *Employment.* The needs of service industry have, to some extent, already been discussed in the paragraphs dealing with the central area and in the proposals for a number of district centres throughout the new development. With respect to manufacturing industry, it is more difficult to establish the demand for land at any one place or at any one point in time. For this reason an element of flexibility has been allowed in the proposals. North of the Tay, land is shown for some 126,000 people including population displaced by redevelopment and the formation of new households. This population could be related to some 20,000 manufacturing jobs which, at a density of 25 workers per acre, would need some 800 acres. The new sites suggested together with undeveloped sites within the Development Plan amount to approximately 1,200 acres. The balance of 400 acres provides both for choice in the short-term and expansion potential in the future. South of the Tay there is land for some 40,000 persons. If opportunities for those likely to be employed in manufacturing industry are to be provided in the area there would be a demand for some 7,000 jobs. This in turn would lead to a demand for 280 acres compared with the 350 acres proposed. Reflecting the need to induce industry to move into the area our proposals for industrial sites are aimed at providing flexibility, choice and expansion potential. In addition to the sites mentioned above there is the extensive site at Easthaven which could be taken up under the conditions spelt out in Chapter 4, (The Long-Term Options).

79. *Communications and Transport.* The lack of any spare capacity on some of the main radial routes has already been referred to in paragraph 32. The traffic studies (Chapter 22) indicate that in the wider context, the main roads, allowing for improvements at present programmed, should prove capable of handling regional traffic. The Dundee Area Land Use/Transportation Study is currently investigating the more complex issues within the area as well as examining the full implications of the expansion proposals (see para. 75). The roads serving the expansion areas have been carefully considered in relation to topography and existing development as well as to the concept of a hierarchy of regional, primary and local distributor routes. Wherever possible advantage has been taken of existing roads so that the necessary improvement and upgrading can take place in step with development.

80. The hierarchy of routes together with the pattern of land uses suggested in Diagram 27 provides the basis for an efficient public transport system within 10 minutes walk of the majority of people living or working in the new areas. The use of many of the existing roads means that the proposed system could be developed from the existing pattern of bus services already operating in the Area.

81. Development may provide an opportunity for extending the scope of present day commuter services on the Arbroath—Dundee—Perth rail line. The build up of population on the south bank may also justify the provision of additional facilities on the Dundee—Edinburgh railway line and perhaps the re-opening of the Newport line. These opportunities which could involve the improvement and upgrading of existing station and parking facilities should be considered within the framework of a public transport system that integrated bus and rail services.

82. *Greenbelt.* As previously noted (see para. 9) Dundee stands on one of the finest town sites in Britain with a series of south-facing slopes, parallel to the wide mouth of the Tay, offering extensive views across the water to the hills of Fife. In the past, topography has tended to restrict development to the north and expansion for the most part has taken place to the east

and west of Dundee. Our studies have confirmed that these directions of growth offer the greatest potential for development and the attainment of high quality living and working places. Even without population growth the pressure of redevelopment and displacement over the next 30 years are bound to be considerable (see Chapter 18). As we discuss in Chapter 4 these demands for space in the vicinity of existing towns, will involve a review of Green Belt policies. We suggest in that chapter that this review could result in stronger and more positive policies for the control and direction of development in the vicinity of towns. Policies appropriate to three different zones are distinguished.

83. In the Dundee Area the present statutory Green Belt should be altered only when the long-term directions and zones of growth which we have suggested, are agreed. Then policies for the three zones mentioned before could be drawn up as follows:

- (a) *Country Zone:* There should be positive policies for the strip along the northern edge of the possible development areas or growth zones and along the north of the existing City. A well defined edge between urban and rural areas will continue in our view to be important here, and urban development beyond the limits set by topography and city form should be firmly contained by encouraging expansion in the directions of growth suggested. Similarly on the south of the Tay a country zone could be defined in relation to topographical and other containing features.

  Consistent with these policies, development of appropriate type and scale, such as research laboratories or country hotels, could be envisaged within these country zones.
- (b) *Growth Zones:* The areas shown in red on the diagram are those in which development under the control of a programme is recommended. A pattern of internal open spaces - the greenscape - should however be preserved and sporadic or premature development avoided while providing choice of sites. In distinction therefore to the country zones, the policies in these growth zones will arise from a forward plan and programme which will allow a gradual and coherent change from rural to urban uses to take place in step with demand.
- (c) *Greenscape:* The general location of the third category of Green Belt space we have shown in the diagram by a red tone.

84. In all three growth zones in the Dundee area there are topographical or landscape features which should not be engulfed by development. Equally the urban development will be enhanced by open spaces which should be used predominantly for recreation and woodland, or where appropriate for some horticulture. Policies which locate, preserve and programme these areas will be fundamental to the new Green Belt policy.

85. *City Form* In addition to policies for these external zones, principles for guiding the shape and form of the built-up areas as it grows or is redeveloped will be necessary. The dominant and dramatic siting of Dundee has already been mentioned. Views of the City from all directions are important, while views out can be preserved in many instances. All this, together with the recent appearance of a number of tall blocks, suggests that in the Dundee Area, the third dimension is particularly significant. We would suggest therefore that a policy should be drawn up which would set out principles for the appropriate height of buildings in the whole area or certain important parts. Where this 'high building policy' has been adopted in other cities it has allowed developers and designers to be aware of height limitations before commitments have been made rather than at the development control stage.

PHASING

86. The broad policies associated with the first phase development from 1971 to 1981 in the Dundee Area are outlined in Chapter 5. It is suggested in that chapter that an increase of 56,000 people could be achieved in the first ten year period, with some 32,000 of these going to the Dundee Area. In addition, in the Dundee Area, about 30,000 persons from existing built-up areas would require homes in new residential areas.

87. The factors which will influence the actual programme for the construction of homes for these 60,000 people in the three growth zones, particularly in the first five years, will include present commitments, availability of land and services and, for private housing, the popularity of different sites.

88. We suggest that an agreed programme of development in each of the areas will be required urgently and that it should be based on the following considerations.

1. (1) Priority should be given to the creation of further industrial sites on the east and west of Dundee with a concentration of industrial promotion and accompanying housebuilding in these two areas.
2. (2) The size of any building phase in each area should be worked out to accord with efficient use of the roads and services, and education buildings.
3. (3) The maximum choice between the thee areas should be presented.

89. On this basis growth in the various parts of the Area may be demonstrated by the two distributions in Table 24.1.

90. The greatest range in the possible increases in population is shown in the Newport/Tayport area. While we suggest that this area should not be developed in relation to industrial promotion in this first phase it could well be that the attractions of the area and its proximity to Dundee could lead to a considerable spontaneous demand for housing development which we would not wish to suppress. The completion of the present communities to a size sufficient to support a secondary school – an increase of some 5–7,000 people – could stimulate further residential development particularly for those moving out of Dundee. We suggest therefore that the planning of the Newport/Tayport area

TABLE 24.1 Proposed Growth in the Dundee Area, 1971–81[1]

Location	*Distribution 1*	*Distribution 2*[2]
1. East of Dundee	+ 25,000	22,000
2. West of Dundee	+ 20,000	18,000
3. Carnoustie	+ 10,000	10,000
4. Newport/Tayport	+ 5,000	10,000

Notes:

1 Includes 28,000 displaced from existing built-up areas.

2 The distribution shown on Diagram 8.

should in the first instance be for 5,000 people and should allow for the possibility of an increase beyond this to be considered for the second 5 years of the period.

91. The aim of the phasing and distribution is to harness the industrial potential of Dundee by expanding to the east and west. At the same time over-concentration is avoided and a choice of residential locations are provided by encouraging development at Carnoustie and Newport/Tayport. The build up at Carnoustie is complementary to that east of Dundee and would establish a situation from which the arc of development stretching from Monifieth to Carnoustie could be started and extended from either end. South of the Tay the limited build up at Tayport represents the first stage of a development that would gradually extend southwards to link with the development proposed south of Newport.

POSSIBILITIES IN THE VERY LONG-TERM

92. In Chapter 4, (the Long-Term Development Potential,) we consider the situation which might be reached at the end of the century if a population increase of 300,000 has been achieved by then, and we put forward four further development possibilities that might be considered. One of these we suggest could be in the Dundee Area in the vicinity of Kilmany.

93. The studies indicated considerable development potential adjacent to Kilmeny some 4 miles south-west along the A.914 from the Newport-Tayport area. The land here is sheltered by the surrounding hills and in parts is not of high agricultural value. The rolling landscape and existing woodlands provide excellent opportunities for large scale building groups which could be visually screened from one another yet given good access to the A.914. However in the light of our proposals for development in the Newport-Tayport area and the limits on expansion suggested by the Tay Bridge capacity studies (see Appendix Chapter 22) we recommend that any further development immediately south of the river should be re-examined in the longer term and should be carefully linked to the capacities of the Tay Bridge and the approach road networks. We suggest that penetration into this area should only be contemplated in terms of a complete commitment when all other opportunities for development in the Dundee Area have been taken up.

25 The Perth Area

CHARACTERISTICS AND POTENTIAL

1. The Area described below while centred on Perth extends west to Methven, north to Stanley, east to Errol and south to Bridge of Earn, Abernethy and Newburgh. The existing population in the Area is around 59,000. In the Appraisal, Chapter 2, the suggested population increase is 50,000 by the end of the century. Thus Perth will play an important role in the city region as we envisage it.

2. Perth is located at a focal point of road and rail communications in Tayside and its accessibility will be improved once the M90 is completed. This contributes to the view that Perth has considerable development potential and should continue as an important centre complementing Dundee, for both cultural and commercial activities.

3. The landscape of the Area is dominated and physically divided by the Sidlaws which rise to over 800 feet (See Plate 2a). South of these hills lie the Carse of Gowrie and Strathearn which for the most part are flat, intensively cultivated arable areas with a scattering woodland. They are bordered to the south by the Ochils which rise steeply from the valley floors to heights of well over 1,000 feet. There are large blocks of woodland on the Sidlaws and also on Kirkton and Moncrieffe Hills west of the Tay. The woodland extends westwards to define the relatively flat area of Tibbermore which dips gently northwards to the valley floor at Methven due west of Perth. To the north the land rises and the area is characterised by a series of interconnecting valleys, offering glimpses across to the Sidlaws and to the Highlands. This area is generally well-wooded with the exception of a strip about a mile wide extending from Luncarty to Stanley on the west bank of the Tay. North-east of Perth the landscape is generally undulating with plentiful tree cover.

4. The Perth area is drained by the Tay, the Earn and their tributaries. From Stanley the Tay flows southwards through steep, wooded banks as can be seen in Plate 2 (b). South of Luncarty the river is joined by the Almond, flows past Perth and then sweeps eastwards to break through the Sidlaws. The flat floor of Strathearn, which is liable to flooding, is drained by the meandering Earn which finally joins the Tay at Carpow, north of Abernethy. At the confluence of the two rivers the Tay broadens, with extensive marshy banks on the north, and a scattering of sandbanks which are exposed at low tide.

5. Apart from the uplands of the Sidlaws and Ochils the agricultural value of the area is high. The Carse of Gowrie, Strathearn and Tibbermore are the predominant areas of 'A' class land. The cultivated area north of Scone is mainly 'A' class interspersed with pockets of 'B+' land. In contrast the land to the west of the Tay and north of the Almond is nearly all class 'B+'.

6. From the various factors examined in the physical analysis the potential development areas were derived and these are discussed and described in paragraphs 31 to 36 and in Diagram 28.

Perth

7. Some of the opportunities and problems associated with growth at Perth had previously been explored within the context of the Perth Case Study. This exercise, begun in 1964, has been carried out jointly by the Scottish Development Department and Transportation consultants in association with the local authorities. One of the objectives of the study was to examine the implications of doubling the existing population of 45,000, including New Scone. Four alternative distributions (see Diagram 28) were prepared and tested. These investigations and conclusions were taken into account by us in selecting development opportunities and particular attention was paid to the problems identified in the traffic analysis. In addition the opportunity was taken to use the information gathered by the Case Study to investigate the cost of alternative development possibilities (see paragraph 30).

8. Perth is the largest settlement in Tayside after Dundee. It is situated on the banks of the Tay at its uppermost navigable reach some 25 miles from the mouth of the estuary. The site, for many centuries the lowest point at which the Tay might conveniently be crossed by ferry or bridge, is a natural place of junction. Perth grew both as the focus of a widespread, predominantly rural region and as a strategic centre of communications. The town has a fine setting, contained on three sides by wooded hills which help to give Perth its memorable image of a compect urban area, enlivened by its spires, meadows, and bridges over the River Tay. Unfortunately this character has in part been weakened by the sprawl of suburban housing over the ridge on the west, although this situation may improve in time as newly-planted trees mature. Today Perth has a wide range of functions: it is the county town, an administrative and judicial centre, a shopping and service centre for an extensive area, it has a flourishing cattle market and a limited, but increasing, range of industries.

9. *History.* Although for a period during the Middle Ages Perth was the capital of Scotland and later an important ecclesiastical centre, until the sixteenth century the town consisted of only two wide parallel streets, High Street and South Street. A period of expansion began in the eighteenth century: Smeaton's Bridge was built, cross streets parallel to the river were constructed, Perth's 'facades' to the river and the Inches were begun and the 'suburb' of Bridgend, over the river,

was opened up for development. During the nineteenth century the railways were built and expansion continued. During the present century expansion has continued principally to the west and to a lesser scale on the east bank of the Tay. A significant change from previous periods has been the part played by the local authority and by private trusts in providing housing. Topography has rendered expansion other than to the north and west difficult. Industry has tended to develop along the flat sites on either side of the railway to form e strip separating the old town from the more recent housing extensions.

10. *Population.* The population of the burgh increased steadily during the nineteenth century to reach almost 36,000 in 1911. After a temporary decline between the wars population rose again and in 1966 stood at some 41,000. Recent trends indicate only slow growth, natural increase almost offset by migration.

11. *Employment.* The importance of Perth as the employment centre for the surrounding area is suggested by the travel-to-work figures. In 1966 about 1,700 more people (or approximately one in ten of its work force) entered the Burgh to work than residents left to work outside. It is probable that the R.N. Stores Depot at Almondbank and Bridge of Earn Hospital account for a high proportion of the 2,600 people who work outside the burgh. Within the Burgh almost two thirds of total employment (64%) is in the service industries compared with less than half (46%) in Dundee. Again the proportion employed in office work is some 26% in Perth compared with only 17% in Dundee. Manufacturing industry accounts for less than one quarter of the work force compared with over half in Dundee. Recent developments should, however increase the amount of manufacturing industry and broaden the employment base.

12. *Industry.* Industrial location is mainly confined to an area adjoining the railway although recent development has taken place to the north and north-west of the town. The current Development Plan caters for further industry with a 40 acre site at North Muirton. A recent amendment to the Development Plan includes 136 acres for industrial use at Inveralmond.

13. *Housing.* The Burgh has no large areas of tenements. In recent years its housing stock has been considerably improved by a reduction in overcrowding and en increase in basic amenities, although it still had a significant problem in 1968 with over 2,700 unfit houses. There has been a comparatively high rate of housebuilding since the war and a feature of this has been that over the period 1964–66 almost half the houses were built by private enterprise compared with proportions of one in five in Dundee and one in six in Arbroath. 3,900 houses will need to be replaced by the end of the century. This is a smaller proportion in relation to the size of Perth than the probable programme for either Dundee or Arbroath. The present local authority housing programme between 1967 and 1971 is 1,500 houses: to meet this demand and future need 100 acres have been allocated in the Development Plan. In addition 200 acres have been allocated for private housing.

14. *Water and Drainage.* Water supplies are drawn from the Tay and the treatment plant at Muirton could be readily extended to provide for a doubling of the 42,000 people served at present. The main sewage disposal system for the town is at present being reconstructed and extended to a new treatment works at Sleepless Inch several miles downstream. When complete the system will be able to cater for an additional population of around 10,000.

15. *Education.* Perth contains almost half the available places in Secondary Education in Perth County. There is a Technical College for which a new building is being constructed.

16. *Recreation.* Perth's principal recreational assets are the Inches, the meadows flanking the town centre to north and south, and Friarton Island which contains one of the town's three 18-hole golf courses. The Burgh is particularly well equipped with social, cultural and recreational facilities and given the sizes of the populations is relatively better supplied than Dundee. The facilities deserving special mention include the theatre, providing weekly repertory and a Spring season by Scottish Opera, and the recently completed indoor sports centre north of the town. Two areas adjoining the town have recently been designated as of 'great landscape value'. One includes Kinnoull, Moncrieffe and Kirkton Hills to the south, while the other takes in Scone Palace and Park and an area west of the Tay.

17. *Central Area.* The town centre, in the historic core of Perth, is compact and well-defined. Shopping facilities are particularly good and there is a range of high quality shops. Total turnover per head of population in 1961 was £270 per annum compared with £181 in Dundee, sales to visitors helping to account for this difference. Although a considerable amount of rebuilding has already taken place the character and townscape have not been seriously impaired. The Perth Case Study suggested that a doubling of the town's population could result in a demand for a 15–20% increase in shopping floorspace. The demand for car parking spaces was set at 1,000 over and above the 5,000 to 6,000 spaces required by 1985 to serve the present population. Detailed studies carried out as part of the Perth Case Study suggested that these demands could probably be met in the central area while still maintaining its present character and scale.

18. *Transport and Roads.* Perth has main line 'Inter-City' rail services to the other major towns in Scotland. There is also a harbour at Perth which handled 160,000 tons in 1966. In spite of restrictions on the size of ships owing to the depth of the navigable channel, improvements are being carried out at the harbour in anticipation of increasing trade. There is an airfield with grass runways at New Scone, to the north-east, which is available for private and company flying and for training pilots. Perth is served by seven major roads, including links with Glasgow, Edinburgh, Dundee and Aberdeen and Inverness. The congestion due to the mixture of regional, local and central area traffic characteristic of

any town built on a radial pattern, is increased in Perth by the limited number of river crossings. At present regional traffic which is forced to pass through the centre is eased by one-way systems and by parking controls. In future a high proportion of this traffic will be diverted from the centre following the building of the southern by-pass which will link the A.9, the M.90 and the A.85 (Dundee), the latter by way of the new river crossing at Friarton. All these improvements are scheduled for completion during the early 1970s. Longer-term proposals are for a Western By-pass to connect the A.9 (Glasgow), the A.85 (Crieff) and the A.9 (Inverness). Even allowing for these improvements, the Perth Case Study indicated that with a doubling of the present population there would still be considerable pressure of traffic on the central area.

19. *Summary.* Perth has considerable potential for development. The attractiveness of the existing settlement, the fine natural setting, the programmed road improvements, the high quality of social, cultural and commercial facilities and the ease with which the water supply can be doubled are offset only by the comparatively limited spare capacity of the new sewage treatment works.

Abernethy

20. Abernethy is the smallest burgh in Perthshire with a 1961 population of about 600, although following recent boundary extensions the 1966 mid-year estimate was about 800. The town, which contains buildings of considerable historical value, is on a gentle north-facing slope, backed by the Ochils, eight miles south-east of Perth and three miles south-west of Newburgh. It is a dormitory town, with over four-fifths of its resident employed population working elsewhere, roughly half in Perth and a large proportion in Newburgh. The potential for expansion is limited, particularly by drainage problems.

Newburgh

21. Newburgh is on the south bank of the Tay some 8 miles downstream from Perth. It is about 12 miles by road from that centre and about 18 miles from Dundee. The town stands on a narrow strip of flat land backed by the steep slopes of the Ochil Hills, and enjoys good views both up and downstream. It suffers from being slightly removed from the main road and rail links and is overshadowed by quarry workings.

22. Newburgh's population level has fluctuated with the fortunes of its industries. After a period of slow growth, the population declined owing to emigration between 1961 and 1966 when it was about 2,200. Newburgh is a manufacturing town and is very dependant on one firm which employs the equivalent of half of the resident working population; there is adequate land for industrial development adjacent to existing industry.

23. Poor housing conditions have been remedied in recent years and the local authority have a scheme for constructing 250 more houses mainly by infilling to the south of the main road through the Burgh. It is estimated that 250 houses will be needed for replacement of unfit housing between 1971 and the end of the century.

24. In appearance Newburgh forms two district sections: the old spacious High Street is lined with attractive buildings, mainly stonebuilt, two-storeyed and with long gardens; the industrial area, between the High Street and the river is characterised by large brick-built factories. Although the town has a considerable number of shops the retail turnover per head of population is very low, in spite of the greater number coming to the town to work than leaving it to work elsewhere. This seems to be due to the comparatively short distance to Perth and consequent dependence on it for most retail purchases. Newburgh is fairly well provided with social facilities and opportunities for recreation, notably yachting in the estuary.

Other Settlements

25. There are some 8,000 people (1961 data) in settlement outside Perth and the two Small Burghs. New Scone, with over 3,000 inhabitants, is the largest settlement; it is an elongated town astride the A94 road to Coupar Angus some two miles from Bridgend. It has grown considerably in recent years, largely with private enterprise housing. The settlement is primarily residential with only a few shops and is for the most part dependent upon Perth for other services and employment.

26. Bridge of Earn (400) is on the A90 trunk road, four miles south of Perth. The teaching hospital just to the east is an important source of local employment. Almondbank and Pitcairngreen are located four miles north-west of Perth close to the Royal Navy Stores Depot. They have between them some 350 inhabitants.

27. After New Scone, the largest settlement in the Area is Stanley (1,450) seven miles to the north of Perth on the right bank of the Tay. It is a compact town in a pleasant setting with some industrial employment. Errol, (900) situated on a ridge at the western end of the Carse of Gowrie near a disused wartime airfield, is some nine miles south-east of Perth. Methven (800) is an agricultural village on the A85 Crieff road about six miles north-west of Perth.

28. The remaining settlements in the Perth area are predominantly small agricultural villages although Luncarty (500) on A9 trunk road four miles north of Perth, has a textile mill. There are also Balbeggie (300) and Forgandenny (200).

29. Although the more detailed studies show that a number of settlements are capable of limited expansion, large-scale potential is not apparent and therefore attention was concentrated on the areas adjacent to Perth.

THE COSTING STUDY

30. Data from the Perth Case Study was used as a base to investigate the costs of the four alternative plans for the expansion of Perth. The general objective of the study was to develop a systematic approach which could be used by planning authorities faced with a range of

alternative schemes, while a specific objective was to calculate and compare the costs of the four expansion proposals. The Costing Study is summarised in an Appendix at the end of the Chapter.

ALTERNATIVES

31. The initial Appraisal, Chapter 2, suggested that by 2001, the Perth Area could accommodate an extra 50,000 people. This build up of population is related to the regional service centre role envisaged for Perth, and to the economic importance of the existing community. In addition land must be provided for an estimated 7,300 people displaced from the existing built-up area owing to replacement and the formation of new households. The Perth Area has a variety of suitable residential sites in addition to large areas suitable for industrial development. Apart from the area close to the City of Perth, however, there was little spare capacity in engineering or commercial services.

32. Areas potentially suitable for residential development were identified around New Scone, in the Carse of Gowrie, Strathearn, and between Almondbank and Luncarty. The main areas with industrial potential were in Strathearn, an area between Cotton and Blackhill Woods on the A.9 (Glasgow road), the south bank of the Almond River from North Muirton to Almondbank and north of Luncarty along the A.9.

33. The Perth Alternatives, Diagram 28, illustrate how some of the options referred to above may be taken up. It shows also how different policies can lead to different solutions. Plan 1 shows development on the good agricultural land immediately west of Perth. Expansion in this direction reflects the pattern of growth over the last 40 years. Although this option was shown to have the lowest costs the benefits do not appear to be as significant as they could be for other patterns of expansion.

34. Plan 2 indicates the effect of placing a restraint on development on 'A' class land. The pattern of development to the north of Perth could provide a number of attractive residential settings screened from one another by woodland and topography.

35. The extension of Perth in a way which reflects its present character, which is inextricably linked to the river and riverside open spaces, is shown in Plan 3. As would be expected the additional river crossings to allow the expanded town to function are reflected in the main road development costs (see Appendix Table 1). Development on the east side of the Tay opposite the River Almond would intrude into an Area of Great Landscape Value.

36. Plan 4 illustrates the development of the existing satellite settlements around Perth. The diagram shows most of the expansion at Bridge of Earn as well as development at Methven and Pitcairngreen. The costing study indicated that expansion in this form could incur high recurrent costs in view of the longer travel distances.

PROPOSALS *(See Diagram 29)*

37. The residential opportunities in the Scone area extend northwards in an arc from New Scone to the banks of the Tay and to Guildtown while the limited industrial potential is alongside the A.93 and A.94. These opportunities are restricted by the airfield north of New Scone, the agricultural value of the land and the limited accessibility from the area across the Tay to Perth. In view of all these factors it is suggested that development in the Scone area should be limited to around 2,000 people and should follow a solution to the problem of through traffic.

38. In the Carse of Gowrie the area potentially suitable for residential development extends from Kinfauns through Glencarse and along the wooded ridge to Errol. The potential industrial areas are alongside the A.85 east of Glencarse. However the land is of high agricultural value, the flatter land is poorly drained, there is a mesh of road, rail and overhead electricity lines and there is limited accessibility across the Tay to Perth. Taking these factos into account plus the safeguarding of the Errol airfield site for future operational use it is suggested that only small scale long-term development up to 2,000 persons should be encouraged on carefully selected sites at Glencarse or Errol.

39. In Strathearn there are residential opportunities immediately west of Bridge of Earn, in the area extending from Forgandenny almost to Forteviot and on the gentler south-facing slopes north of the Earn. Industrial potential is limited to the floor of Strathearn from Forteviot to Forgandenny Station and south of Bridge of Earn along the A.90. Development is limited by a number of factors including the high agricultural quality of the land, the probability of flooding and the traffic problems revealed in the Perth Case Study (Plan 28.4). The suggested development is in the area immediately west of Bridge of Earn where up to 5,000 people could be housed in the long-term.

40. Development to the west of Perth (Plan 28.1) is likely to be relatively cheap especially in the provision of roads. Unlike other areas, however, where residential potential is associated with south-facing slopes, shelter, woodland and views, the potential west of Perth is limited, although there are opportunities in the Methven area. Industrial potential is confined to the area alongside the A.85 from the outskirts of Perth half-way to Methven and adjacent to the A.9 (Glasgow road), about a mile from Perth between the Cotton and Blackhill Woods. Restraints include the high agricultural value of the land, the extensive deposits of sand and gravel, the relative lack of residential opportunities and the problem of defining expansion in a generally featureless area. In addition development would be clearly visible from the A.9 and the A.85 (Methven) roads. It is suggested that development in this area should be limited to the line of the western by-pass road.

41. North of Perth (Plan 28.2) the residential opportunities extend from Almondbank through Pitcairngreen

to Moneydie and Redgorton as well as an area adjacent to Stanley. The industrial potential includes the south bank of the Almond between Almondbank and North Muirton and an area alongside the A.9 from Luncarty towards Bankfoot. Although the costs of development of Plan 2 are more than Plan 1 the benefits of development in this area are considerable. The undulating, tree covered topography would not only provide shelter and good environment but would also minimise the visual intrusion of development in the area. The agricultural value is less than for the other potential development areas described above, advantage could be taken of the western by-pass and the proposed upgrading of the north-bound A.9 road and the development would conform with present local authority proposals for an industrial area alongside the Almond River.

42. The following proposals, illustrated on Diagram 29, show how the Area, together with the proposals outlined in paragraphs 37 to 39 could provide for 50,000 additional people as well as catering for the needs of redevelopment and changes in household structure. The main residential development extends from the north bank of the Almond with a wedge of woodland and loch to separate it from the Moneydie and Redgorton area. There is then a strip of residential development along the Tay to just beyond Stanley. The proposals include residential infilling between the suggested line of the western by-pass. Industrial development is in two parts, one site located along the south bank of the Almond and the other north of the main residential area betweeen the A.9 and the main north-bound railway line. The development would be served by two flanking roads, the present A.9 Dunkeld Road and the realigned western by-pass linking the A.9 (Glasgow) to the A.85 at Huntingtower then crossing the Almond to the Shochie Burn which it would follow to join the present A.9 at Downhill.There would also be a central primary distributor road serving a new district centre, the residential and industrial areas, as well as providing access to the existing town centre via the A.85. The extensive woodlands coupled with the topography and the rivers help not only to define the edges of development but also to provide a series of open space links between various land uses. In this way the area could provide a choice of urban sites in rural settings.

POLICIES

43. There are a number of policies, in line with the main proposals for growth outlined above, that we recommend for the attention of the planning authorities.

44. *Perth Central Area.* The Perth Case Study indicated that there was potential for development, including pedestrian precincts, in the town centre commensurate with the approximate doubling of population. However such development would need to be carefully related to the existing fabric to avoid serious damage to the present charm and character of the centre. It is suggested that a townscape policy for the central area be prepared.

45. *Transport.* The Perth Case Study traffic analysis show that there would be considerable pressures on the central area if no limitations were placed on the use of private vehicles. It may well be necessary to provide a multi-lane one-way road system around the centre together with service roads and large car park areas. These demands need to be carefully investigated to determine their probable impact on the existing environment. In the light of these more detailed studies it will be possible to prepare a transport policy which would allow for the requirements of both public and private transport, the various space needs in the centre and the resulting traffic flows. The programmed improvements and by-passes outside the Burgh will help to reduce the loads at present imposed intrinsically by through traffic.

46. *Employment.* The service centre functions of Perth and the significance of the central area have already been referred to (see paras 11 and 17). The importance of introducing further manufacturing industry into the area requires good industrial sites with room for expansion. To the north of Perth land is shown for housing some 48,000 people. Such a population could be associated with some 8,000 people in manufacturing at a density of 25 workers per acre, needing some 320 acres. The approved Development Plan sites and new sites suggested together total 525 acres which provides for choice in the short-term and expansion in the future.

47. *City Form.* Perth has a very pleasant natural setting in a sheltered river valley. Expansion in the more recent past has been to the west and on to the skyline. This has tended to break the original containment of the burgh within the river valley. To some extent the Burgh's active tree planting programme may help to reinforce the western skyline in the longer term. We recommend that any further development to the west be limited to the line of the by-pass and that consideration be given to an advance shelter-belt planting programme. Our recommendations are aimed at small scale urban development areas in the sheltered valleys to the north. The existing woodland and the natural screening in this area could provide a very high-quality living and working environment. The theme of riverside open spaces associated with Perth could be carefully linked with new development to the north and repeated along the banks of the Tay to Stanley.

48. *Phasing.* The broad policies associated with the first phase of development in the area are outlined in Chapter 5. Given the intention of achieving the upper population remit level, the development proposed for the Perth expansion areas is an increase of 14,000 in population by 1981. It is recommended that most of the first stage development should take place to the north of Perth and should be linked with the promotion of the associated industrial sites. As development extends it would be possible to phase in the western by-pass. In addition to the main development, planned extension of the smaller settlements within the Area would offer a further choice of residential sites.

Appendix to Chapter 25

THE COSTS OF EXPANDING PERTH[1]

A1. Perth was assumed to grow by equal annual increments of population from 1969 to 1985 to reach a total population of approximately 90,000. The four expansion possibilities for which costs were investigated are illustrated on Diagram 28, Perth Alternatives, and described in paragraphs 31 to 36.

A2. The costs of expansion may conveniently be divided into three main classes: (a) development costs (including land, construction, fees, interest); (b) recurring costs; (c) the cost of inducing firms to locate in the area. It was assumed that (c) would be the same for each of the four plans, and it is not considered further in this Appendix.

A3. The major factors affecting development and recurring costs appear to be:

(a) Land-use relations: shape; densities; the size of the development; system of transport and communications;

(b) the form and extent of associated settlements; and

(c) the phasing of development.

Residential and industrial densities per acre were assumed to be the same for each plan as were the size and phasing of the increase in population and the mode of transport.

A4. Since the existing settlement of Perth was common to all four possibilities any variations between development and recurrent costs of the four plans, given the assumptions, will be caused by differences in land-use relations and shape. Estimates were made of variations in development and recurrent costs.

A5. An appraisal of development costs at 1969 prices was undertaken in consultation with the authorities listed in Table A1. In comparing the four plans it was expected that the following components: land; residential site preparation; industrial site preparation; development of the central area of Perth; main roads; sewerage; water; electricity; gas; telecommunications; postal services would show significant variations in costs. All other development costs were deemed to be the same for the different plans, or unlikely to vary significantly between them.

A6. Indicative development costs for each of the components thought likely to vary were estimated for each of the four possible ways of extending Perth (Diagram 28). This work showed that some of the above components were unlikely to vary significantly from plan to plan. The estimates are given in Table 25.1

A7. These indicative development costs made it possible to rank the four plans in order of increasing cost. Plan 1 appears to be cheapest, followed by Plan 4, which might cost an additional £3.5 million. Plan 3 might cost at least £6 million more than Plan 1, and was the most expensive. Plan 2 was estimated to be only marginally more expensive than Plan 4, the differential being about £1 million. The differentials between the plans were attributable largely to the cost of road development.

A8. An appraisal of recurrent costs was undertaken in consultation with the appropriate authorities including the Scottish Development Department, the North of Scotland Hydro-Electrical Board, the Scottish Gas Board, and the Post Office. The costs considered to be relevant were the cost of vehicular travel, road maintenance; road accidents, sewerage; water supply; electricity; gas; and postal and telecommunications. Our enquiries showed that only in vehicular travel could significant variations be calculated among the four plans.

A9. The variations in vehicle travel were estimated on the basis of predicted journeys on the road network proposed for 1985. These journeys were of three types: journeys entirely within Perth; journeys starting or terminating within Perth; and journeys from and to external points but passing through Perth. The year 1985 was selected as representative because it enabled us to make use of the Perth Case Study data and analysis, without which it would have been impracticable to make estimates. The order of magnitude of vehicle miles per year associated with each of the four plans was estimated to be as follows.

	Annual vehicle miles (millions)
Plan 1	220
Plan 2	230
Plan 3	260
Plan 4	300

While the absolute magnitudes of these figures are very doubtful, the ranking provided by the estimates is much less doubtful. They show that Plan 1 would be cheapest in terms of the cost of vehicle travel, followed, in order, by Plans 2, 3, and 4.

Conclusion

A10. The ranking of the four plans, in increasing order of cost, comes out as follows according to our investigations.

Development Cost – Plan 1; Plan 4; Plan 2; Plan 3
Recurrent Cost – Plan 1; Plan 2; Plan 3; Plan 4

In both cases, the least cost solution is given by Plan 1. This is not, however, the end of the story as benefits have also to be considered. On the benefit side, we made no quantative estimates. It was concluded that the benefits of Plan 2, notably the possibility of a particularly attractive residential environment and the saving of agricultural land, were sufficient to justify its nomination in preference to Plan 1 despite the greater costs likely to be incurred both in development and thereafter.

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[1] This Appendix draws heavily on data collected and processed as part of the Perth Case Study and because of this we have taken the Case Study's proposal of a population of 90,000 by 1985 as the basis of the exercise described here. This approach seemed to us to afford an adequate basis for appraising, in broad terms, the four plans outlined.

TABLE 25.1 PERTH DEVELOPMENT COSTS
(Estimated costs in £million at 1969 prices) [1,2]

Component		Authority/Source	Plan 1	Plan 2	Plan 3	Plan 4
1	Land[3]	Teyside Study Group; Perth County Assessor; District Valuer	1.0	1.0	1.0	1.0
2	Residential site preparation	Gradient Analysis; and K. Gee, 'Ground Slope Cost Curves', *Chartered Municipal Engineer*, 1962	4.5	5.0	4.5	4.5
3	Industrial site preparation	Gradient Analysis	K	K	K	K
4	Central area	Perth Case Study (Jemieson & Meckey)	K	K	K	K
5	Main roads	" "	7.0	10.0	11.0	9.5
6	Sewerage	Scottish Development Department	4.0	4.5	5.0	4.5
7	Water	" "	K	K	K	K
8	Gas	Scottish Gas Board	2.0	2.0	2.0	2.0
9	Electricity	N.S.H.E.B.	5.0	5.5	6.0	5.5
10	Tele-communications and Postal	Port Office	1.0	1.0	1.0	1.0
	All Development Costs not in 1–10	Teyside Study Group	K	K	K	K
	TOTAL OF VARIABLE DEVELOPMENT COSTS		24.5	29.0	30.5	28.0

Note:

1 Plan 3 would probably give rise to some compensation for fishing rights. No allowance has been made for this.

2 'K' means that the item or items are deemed constant or not likely to vary significantly between the different Plans.

3 The estimates are based on the value of the land under agricultural activities, no account being taken of potential development value.

26 The Core Area Burghs

1. Following the chapters on Dundee and Perth, this chapter reviews the present circumstances and future possibilities of the other principal burghs in the 'core area'. They are not taken in isolation but treated as part of a wider surrounding area and including, where appropriate, other burghs. Six areas are discussed; (1) Arbroath; (2) Forfar and Kirriemuir; (3) St Andrews; (4) Montrose and Brechin; (5) Alyth, Blairgowrie and Coupar Angus, (6) Cupar. Each area is expected to be able to cater for a sizeable increase of population (see Chapter 4) in the long-term and, in addition, the first three areas may also expect some increment during the first phase before 1981 (see Chapter 5-Phasing Proposals).

2. The general methods used are as described in the introduction to this part of the Report. The investigations were similar to those followed in the previous chapters on Dundee and Perth except that in several cases a more general analysis has been done and structure sketches illustrating the general directions of growth are put forward. In the case of Arbroath and Forfar, however, it was found necessary to analyse the growth potential in more detail and diagrammatic layouts accompany these sections.

THE ARBROATH AREA

Characteristics and Potential

3. The Arbroath area has been defined to include Arbirlot and Balmirmer to the west with Friockheim and Inverkeilor in the north. The existing population of the area is approximatley 25,000.

4. Within the suggested regional pattern an important role is proposed for arbroath. Suggestions for development on the east of Dundee, including Carnoustie and Easthaven, could lead to a controlled but not continuous system of development opportunities between Dundee and Arbroath. In addition further industrial growth at Arbroath could stimulate developments to the north-west of the area. On this basis the population increase suggested for the area is 20,000.

5. The Arbroath area corresponds roughly with the catchment areas of the Brothock Water, Lunan Water and Elliot Water. The first two rivers drain generally flat fertile valleys extending south from the watershed at Leysmill near Friockheim and east to Lunan Bay. From Elliot westwards and at Lunan Bay the area is flat with a sandy coastline. On the north-west, the Sidlaws descend gently through the rather bleak uplands of Carmyllie and Redford to Leysmill. Further east the land rises and ends in the cliffs of Montrose Heed. South-east of Leysmill the country is fertile and undulating and meets the sea in the dramatic range of cliffs between Lang Craig and Whiting Ness. The main wooded area is at Montreathmont, north of Friockheim, and smaller areas are located at Ethie, Magungie and Letham Grange, three miles north of Arbroath.

6. The agricultural value of the coastal area between Arbroath and Carnoustie is particularly good. Arbroath is surrounded by 'A' class land although there are areas of 'B+' land to the west of the A.933 Friockheim road and to the north and east at Magungie, Newbigging and Dickmount. Other large areas of 'A' class land cover much of the south-eastern coastal area, as far inland as Kinblethmont and Inverkeilor, and the slopes north and east of Friockheim. There is a limited amount of raspberry cultivation mainly in sheltered inland areas.

7. From the various factors examined in the physical analysis three potential development areas were identified: general urban development to the north and west of Arbroath; residential development to the west of Arbirlot (two miles west of Arbroath); and industrial development on the disused airfield to the north east of Friockheim.

Arbroath

8. Arbroath is a pleasant, compact seaside town with an attractive centre built of red sandstone and dominated by the impressive Abbey ruins. (See Plate 3). The harbour formerly enjoyed a considerable overseas trade but is now used almost exclusively by the small fishing fleet. After a period of decline, the population grew after 1961 to reach 21,000 in 1966.

9. The main employment is in manufaturing industry in which, since the war, engineering has taken over the dominant role from textiles. The town is not an important administrative centre and its shopping trade is sustained in part by summer tourists. 1,650 residents of Arbroath work outside the town, while 880 people come in to work. This reflects the importance to the town's economy of three main sources of employment outside the burgh: the City of Dundee, the industrial works at Dowrie and in particular the RN Air Station (HMS Condor) which employed 300 civilians in 1969 and is to be run down and closed as a Naval Air Station by 1971. The Ministry of Defence has however decided to retain the base which will be occupied by the Royal Marines. It remains to be seen that employment generated by this new use will compensate for the loss of the Royal Naval Air Station. There is a large fully-serviced industrial estate at Elliot to the west of the town where 75 acres are available for incoming industry.

10. The local authority has pursued a vigorous post-war housing programme which has already done much to overcome the worst problems of overcrowding and lack of amenity. A scheme to provide for overspill population from Glasgow has been initiated but has received little support. It is estimated that some 1,100

houses will need to be replaced between 1971 and 1981 and 66 acres of residential land will be required for the displaced population. At present there is undeveloped land within the burgh boundary sufficient to satisfy the housing programme up to 1970. Arbroath Burgh envisages expansion north towards Kirkton and Marywell to cater for an increase of some 30,000 people; on this proposal industrial sites would be located to the north-east of the burgh in the vicinity of Dickmount Law. The authority has contemplated an ultimate population of about 100,000 people.

11. Water supplies are drawn from Glenogil and distributed from a storage reservoir to areas below 240 ft. Although existing supplies are sufficient for only an additional 5,000 people augmentation from either Lintrathen or Loch Lee can readily be made available. A new trunk sewer at present being laid is scheduled for completion by 1972 and is designed to serve an additional population of 20–30,000. The areas that could most readily be drained to it are to the north of the town within the catchment area of the Brothock Water.

12. Completion of the inner relief road and provision of parking and servicing areas with a pedestrian precinct will permit exclusion of through traffic from the centre. In the event of large scale population expansion a by-pass to the west of the town could be required. The town, in its seaside setting is well provided with open space and recreational facilities and has an active programme to encourage summer visitors. The County Technical College is situated in Arbroath. There is no spare capacity at present in the secondary schools.

13. There are two significant physical restraints on the amount and direction of Arbroath's expansion. The first is the high quality of the surrounding agricultural land while the second is the existence of the Air Station. Arbroath displays, however, considerable potential for physical expansion arising from the serviced industrial site, the relief road and new trunk sewer under construction, and the large house building programme.

Other Settlements

14. Friockheim, the largest settlement within Arbroath's sphere of influence, is some seven miles to the north, just off the A.933 road and also at the same distances from Forfar, Brechin and Montrose. It is a compact village with some industrial employment and a population in 1961 of about 800. Other sizeable villages are Inverkeilor, on the A.92 trunk road, with over 200 people, Auchmithie, formerly a fishing village, and Redford formerly a quarrying village, both with over 100 people. Lunan is a small attractively sited hamlet, with a hotel, close to the popular sandy beaches of Lunan Bay.

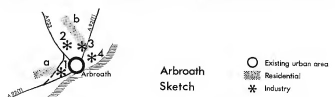
15. These settlements do not appear to have potential for a significant amount of growth. There is, however, some rehabilitation being carried out in Friockheim and other villages. Some infilling could well take place while Auchmithie and Lunan appear to have the potential to cater for more summer tourists. The latter could be the basis for a considerable scheme of recreational facilities.

Alternatives *(The numbers and letters refer to the Sketch below)*

16. As mentioned in paragraph 7 the physical survey showed two main areas for possible residential development; to the west of Arbirlot (a), and to the north of Arbroath (b), the latter also being largely the area selected by the local authority for expansion. These two area may therefore be regarded as alternatives. Economic considerations suggested a population increase in the area of 20,000 which should be closely related to Arbroath itself. In addition, development costs – particularly in relation to services – suggested development in one area only. The alternative presented at Arbirlot is not therefore taken up.

17. There are four possible sites for industrial development close to Arbroath. They are: from Elliot north westwards (1); from the Western Cemetry north-westwards along the A.933, including HMS Condor (2); and two parallel strips related to the A.92 running northeastwards from Hayshead and Seaton (3 and 4), in the same general area as those selected by the local authority.

18. The extension of the existing Elliot Industrial estata into the first alternative area is inhibited by the agricultural value of the land. This is graded class 'A' (DAFS) and class '1' by the Macaulay Land Use Capability Survey. Moreover an area of large scale industrial development would be difficult to define before the line of the western by-pass to Arbroath had been determined. The most important factor weighing against this development would be its separation from



Arbroath Sketch

the most favourable residential site on the north of the Burgh. In this event journeys between homes in the north and work on the south-west would tend to take place through the centre of the town. The western by-pass would not provide the most direct route for this journey. Against this industrial firms might find locations in this area attractive since it is on the Dundee side of Arbroath and could be accessible to the western by-pass when it is constructed. In view, however, of the difficulties mentioned above, this alternative has not been put forward as a proposed industrial site at this stage and equally attractive areas are presented by the other alternatives.

19. The last two alternatives (3 and 4) for industrial development lie to the north-east of the burgh. The strip on the East of Dickmount Law is sited on first-class agricultural land. Moreover industry sited in this area would be visible from the cliff tops. This area should be conserved for agricultural and recreational uses. The strip on the west of Dickmount Law presents a valid possibility for industrial development but in the first instance offers greater potential for residential use. The most favourable alternative presented therefore for industrial development is in the area from the Western Cemetery north-westwards including HMS Condor.

20. Looking at the wider area the physical analysis identified potential for industrial development to the north-east of Friockheim. The characteristics of the site are described in Chapter 4. This possible site could serve a wide area and be of regional significance. It has not been taken into account in the proposals for the Arbroath Area.

Proposals *(See Diagram 30)*

21. The residential alternatives selected occur to the north of Arbroath. The topography there is more undulating and has more tree cover so that development would be less intrusive in the landscape, while the areas at Magungie, Newbigging and Dickmount are also of lesser agricultural value. Development can readily be drained to the new trunk sewer and linked to the existing road system. Advantage can be taken of spare capacity on existing main roads north of the town and on the inner relief road when complete, and through traffic can be catered for on the A.92 and A.933 while local traffic can follow the general line of the Class C road through Magungie.

22. The main residential development extends northwards therefore from Hayshead along the A.92, keeping below the ridge of Dickmount Law to the east and with a wedge of open space to separate it from the hamlet of St Vigeans. The residential area swings west at Marywell with links, in the first instance, following the line of existing minor roads, to the A.933 Brechin road and to the suggested industrial site at HMS Condor. Subsequently these roads would have to be realigned and improved. A further large residential area extends north from Letham Grange on to the lower slopes at Kinblethmont Hill. Existing tree planting defines the edges of the development and helps to relate it to the landscape form while open space as part of the background 'greenscape' is available along the line of the Brothock Water and in the valley near St Vigeans.

23. As already mentioned the most attractive industrial location identified was in the vicinity of HMS Condor. The Ministry of Defence intends to close this site as an RN station and announced in December 1969 that it will be taken over by the Royal Marines. The whole of this site extends to some 550 acres and on the assumption that the Ministry of Defence would wish to retain all exisiting buildings and airfield facilities, a significant site could remain for industrial purposes. Ready access could be obtained to the regional road network, to the existing Burgh, the proposed by-pass and to the new residential areas described above. We have had no opportunity to investigate this suggestion in detail with the authorities concerned and if this site cannot be released for industrial development it would be necessary to review the other alternatives discussed in paragraphs 17–19. In this event the industrial sites on the north-east of Arbroath, which in our proposals are suggested for residential development, would appear to be the most appropriate location for industrial use. The industrial land required by the additional population would be about 180 acres.

24. Although the additional population suggested for the Arbroath area was 20,000 (para 4), the capacity of the residential areas shown on Digram 30, is 31,000. It is estimated however that space will be required in the long-term for 4,000 displaced by redevelopment and the formation of new households from the present built-up area of Arbroath. Therefore it is possible to provide housing and industrial land for a net addition of 27,000 people in the vicinity of Arbroath. It will be necessary to reconsider the appropriate long-term total population of the Area at a subsequent planning review.

Phasing

25. Following the completion of the Elliot Industrial Estate, HMS Condor or the site to the west of Dickmount Law could be industrially developed. Residential development could progress northwards from the present local authority development by Warddykes Cemetery and could take up in sequence the sites indicated on Diagram 30. The additional population suggested for the first phase, 1971 to 1981, is 7,000, (See Chapter 5, First Phase Development Potential).

THE FORFAR AND KIRRIEMUIR AREA

Characteristics and Potential

26. The area under consideration contains Forfar, situated in Strathmore some 12 miles north of Dundee, the Small Burgh of Kirriemuir and the villages of Glamis and Letham. It has a total population of about 20,000.

27. In a future city region, Forfar is seen as developing into an important district centre offering a wider choice of facilities and more services than at present. It would be connected with Dundee by a dual carriageway link in the regional road system which would bring the Burgh within 20 minutes car journey of Dundee. Growth in the Dundee Area would be expected to stimulate expansion in the Forfar area. The population increase suggested in this context is 25,000 people.

28. Although the agricultural plain of Strathmore, bordered by the Sidlaws and Grampians, extends from

Perth to beyond Brechin it has an important intermediate watershed at Forfar which is drained by tributaries of the Tay, westwards, and of the South Esk and Lunan Water, eastwards. There are hills to the south and east of Forfar which faces northwestwards to Kirremuir located in the foothills on the opposite side of the Strath.

29. While the dominant landscape elements are the plain and the bordering hills, contrast is porvided by the steep-sided glens to the north, by the flat expanse of Montreathmont Forest, by the Muir of Lour to the east and by the narrow partially-wooded valley east of Forfar containing Rescobie and Balgavies Lochs. Apart from Montreathmont the main wooded areas are at Glamis in the glens.

30. Much of Strathmore is of high agricultural value. The largest area of 'A' class land extends west from Glamis straddling the A.94. Forfar is surrounded by 'A' class land except for a strip to the east. Other high value areas are south-west of Kirriemuir, west of Letham and around Tannadice in the north. Most of the remaining cultivated land is classed 'B+' except for a small poorly drained area north-west of Glamis. There is intensive raspberry cultivation in Strathmore, particularly around the main settlements.

31. The physical survey of the general area revealed potential for residential development in three areas; immediately on the south-west and south-east of Forfar; between Forfar and Friockheim at Rescobie; and 3 miles south-west of Forfar by Kinettles in the valley of the Kerbet Water. The only significant industrial potential identified was adjacent to the built-up area of Forfar.

Forfar

32. Forfar has a wide range of functions for its size. It is the county town and acts as an administrative, commercial and service centre for a wide agricultural hinterland. Forfar also provides an appreciable number of industrial jobs. This diversity has contributed to the stability of employment and population since the war. The population reached a peak of 13,500 in 1881 and has now stabilised at 10,000 persons. There are a further 280 people in Kingsmuir and Lunanhead close to the burgh outside its boundary.

33. There is a diversity of manufaturing employment in the town. The textile industry, which accounts for 29% of all employment in the town, is moving towards products with artificial fibres. There is also employment in other types of manufacturing, in retailing, administration and businesses connected with agriculture. Industrial expansion is, however, dependent on population growth for there is already a net daily movement of 700 people into Forfar to work. Some 40 acres at Suttieside and Orchardbank are allocated for industrial development.

34. Forfar's setting and environment could attract population and industry. The road pattern is not, however, well-suited to present conditions and the conflict between the demands of traffic and the quality of environment is especially marked in the town centre. In particular there is congestion at the East Port where five roads come together within a short distance. Sufficient opportunities, including undeveloped areas, exist adjoining the centre to provide both for car-parking and for the construction of an inner relief road to ease congestion and to facilitate expansion (See Plate 4). As part of the improved regional road system a by-pass is envisaged by the County Council and by the Scottish Development Department which would take a wide sweep around the west side of Forfar Loch from the A929 Dundee road to the A94 north of Forfar. Existing retail space is however capable of serving an initial increase of population.

35. Forfar has a good house-building record with 480 houses completed between 1964 and 1968; most of them were built for the Burgh Council. In spite of this record a considerable problem of unfit housing remains. A survey carried out by the local authority in 1968 showed that about 700 houses, or about one fifth of the housing stock were unfit either in whole or in part. It is estimated that 1050 houses will require replacement between 1971 and 2001 and of these 450 will become unfit between 1971 and 1981. By the end of the century it is estimated that 2000 people, requiring 58 acres of new residential land, will be displaced as a result of redevelopment and the formation of new households. At present some 73 acres to the south-west and south-east are allocated in the development plan for housing.

36. The existing water supply system is able to cater for an additional 6,000 people and augmentation thereafter is readily available from either Lintrathen or Loch Lee. The easiest area to serve from existing water mains would be Kingsmuir, to the south-east. The existing sewage works can readily be extended to serve an extra 10,000 people. A recent overhaul of the sewage system and the construction of three trunk sewers provides spare capacity to the east and south while the areas that can most easily be drained into the existing system are to the south-west and south-east. Development to the north would be limited to the area that can be drained by gravitation.

37. With Forfar Loch to the west, the golf course to the east and Balmashanner Hill to the south there are also sufficient open spaces and other recreational facilities to cater for a larger population. Although a new secondary school was completed in 1965 it has no spare capacity.

Kirriemuir

38. Kirriemuir, some five miles north-west of Forfar, lies at 500 ft. above sea level among the foothills of the Grampians. The town has grown outwards from its pleasant, compact and distinctive centre, built of red sandstone, on the left bank of the Gairie Burn. The site has presented problems for development: the town is divided by the burn, and comprises five distinct units between which communication is rendered difficult by a rather complicated system of narrow roads. This will limit the capacity of the centre to serve an increase in population. The population increased from 3,600 to 3,800 between 1951 and 1966, a natural decrease being more than offset by net immigration. A further 290 people live in Westmuir and Maryton close to the burgh but outside its boundaries.

39. There is a considerable dependence for employment on the service industries and on jute manufacture which provides about a quarter of all employment in the town. Kirriemuir also functions as a dormitory town; in 1966 some 310 people travelled daily to work outside Kirriemuir, 180 going to Dundee and 90 to Forfar. The town's future is closely linked with that of Forfar, on which it already depends for services and facilities and for some employment.

40. The town has a very low average rateable value of dwellings, and housing conditions require to be improved. Between 1964 and 1966 there were 15 houses built per annum but in 1967 and 1968 the rate increased to 87 per annum. Some 150 houses will need to be replaced between 1971 and 1981. The Burgh Council has further proposals for rehabilitating sub-standard houses. In the long-term, 1971 to 2001, some 1,000 people may be displaced. There is potential for some limited residential and industrial development and there is considerable scope for infill housing at Nothmuir. For a limited amount of development there are unlikely to be problems of sewage disposal or water supply. Moreover the town, in association with Forfar, has sufficient open space, recreational and service facilities to cope with limited expansion.

Other Settlements

41. Glamis, some five miles south-west of Forfar is a small pretty village set amongst trees and dominated by Glamis Castle, the ancient seat of the Earls of Strathmore. Its population in 1961 was about 200. Letham, some five miles south-east of Forfar, is an agricultural village of nineteenth century origin. It is curiously spacious and sporadic in the nature of its development and in 1961 had some 700 people. There are several other agricultural settlements of which the largest are Tannadice (130 people) some seven miles north of Forfar just off the A.94 and Charleston (70 people) close to Glamis.

42. There does not appear to be any significant opportunity for the expansion of these settlements owing to the lack of suitable sites, services and facilities.

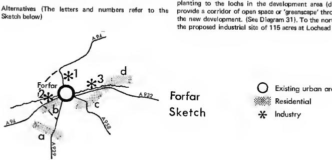
Alternatives (The letters and numbers refer to the Sketch below)

43. The surveys reveal a lack of significant potential at Letham. There is capacity for expansion of Kirriemuir by up to 2,000 people. However in terms of large scale development potential attention focuses on the areas immediately adjacent to Forfar for which a long-term increment of up to 25,000 people is envisaged as part of the regional distribution of population. (See Chapter 2, Appraisal). Some 3 miles to the south-west there is an opportunity for residential development at Kinettles (a). Closer in to Forfar there are three possible residential areas, at Westfield to the south-west (b), immediately to the south-east of the town (c), and beyond this in the vicinity of Rescobie Loch (d). Three areas of industrial potential were identified, a large area at Suttieside to the north of the burgh (1), and smaller areas at Orchardbank on the west (2) and Lochhead to the east (3). No selection between these industrial areas is involved since all may be required for the scale of expansion envisaged.

44. The opportunities for attractive residential development in the Kinettles Valley are considered to be outweighed by the agricultural value of the land, by its isolation from Forfar and by the intrusive overhead electricity lines. Choice between the other three residential areas is more difficult, and all may be regarded as strong possibilities for development.

Proposals *(See Diagram 31 and Sketch below)*

45. The proposals select as the first residential area for development the location immediately to the south-east of Forfar (c), which could contain some 17,000 persons. The land here is below 'B+' in agricultural quality. Development in this direction could mesh with the existing land use structure and proposals. Advantage can be taken of existing parallel roads of which one could serve through traffic and the other could carry local traffic. Most of the area can be readily linked to the existing sewerage system. These factors suggest that the area should be considered as the first phase of housing development. The main residential development stretches eastwards from Forfar to sweep around the golf course to cross the valley to link with the proposed development area at Rescobie (d). Balmashanner Hill and the golf course can be connected by new tree planting to the lochs in the development area (d) to provide a corridor of open space or 'greenscape' through the new development. (See Diagram 31). To the north is the proposed industrial site of 115 acres at Lochead (3).



Forfar Sketch

46. Extending from this area a second residential opportunity is recommended reaching to the north side of Rescobie Loch (d). This area could accommodate some 19,000 persons together with appropriate local shopping facilities. An industrial site, on the east of the main proposed development could be opened up if required. This whole development proposal may well prove controversial mainly because of the wild life interests in the area and also because it may appear somewhat removed from the centre of Forfar. Against this it may be said, however, that the area provides sites for top quality housing in a landscape setting with southern views over the loch towards the wooded slopes opposite. To provide the diversity and choice in housing, which would attract growth to the region, sites of this kind will be required in several places. We recommend that our proposal should be seriously considered in order that these opportunities could be offered. If the whole or part of the Rescobie development is not carried out then it may be necessary to consider the third residential area at Westfield (b). This area could be readily linked to the existing sewerage system and also offers attractive views. However it is of high agricultural value, part being under raspberry cultivation and there is little tree cover; the site is extremely prominent and development would be clearly visible from much of eastern Strathmore.

47. A number of smaller sites in Kirriemuir and Forfar could readily accommodate 2000 people. These include a fine site immediately north of Forfar Loch which, with careful design, could provide a small but attractive extension of the existing built-up-area; this development should be reviewed in relation to local planning issues, townscape and landscape implications. Also forming extensions of the existing urban areas of Forfar are the proposed industrial sites at Suttieside (1) and at Forfar Loch (2). Together these sites amount to 200 acres of land for industry.

48. Depending on the inclusion of the Rescobie site (d) our proposals, illustrated on Diagram 31, provide for 38,000 people and for 430 acres of industrial land. 3000 people will, it is estimated, be displaced from the present built-up areas so that there would be space for an additional 35,000 people. This figure is 10,000 in excess of 25,000 suggested in the Appraisal, Chapter 2 and reflects the physical attraction of the Area for development. The acreage of industrial land is also in excess of requirements and provides for a choice of sites. In the first phase, 1971 to 1981, it is suggested that the Forfar and Kirriemuir Area should grow by 1000 people.

THE ST ANDREWS AREA

Characteristics and Potential

49. The area chosen for study contains the small burgh of St Andrews and is defined in the south by Kingsbarns and Dunino, in the west by Blebocraigs and in the north by Guardbridge and Leuchars. The total population of the Area is about 14,000. From the Appraisal, Chapter 2, it is clear that the regional context and the prospects for an increase of 10,000 in this area are different from those for the other small burghs. The significance of St Andrews in the Region is associated with the University together with the golfing and holiday facilities. It is understood that the University will expand in size and this will be an important source of future growth.

50. The rocky coastline of the East Neuk promontory comes to an end at St Andrews to be replaced by the sandy links which accommodate the golf courses for which the Burgh is world-famed. The sand continues on the north side of the River Eden's tidal estuary at Tentsmuir, now densely afforested. A belt of fertile, undulating agricultural land extends along the coast west of the Burgh. This belt, drained by the Swilken and Kinness burns, contains much of the area's woodland, principally at Strathtyrum and Craigtoun Park. The latter, owned by Fife County Council, is an amusement park of regional significance, some three miles from St Andrews.

51. To the south of the Burgh the land begins to rise more steeply, becoming steadily more exposed, with prominent landmarks in Clatto Hill and Drumcarrow Craig some four to five miles south-west of St Andrews. The watershed is reached in the Largo Ward area, some six miles from the Burgh from where the land drops towards the Firth of Forth. On the north bank of the River Eden the land rises behind the flat coastal strip, on which Guardbridge and Leuchars stand. The most prominent landmark is Lucklaw Hill.

52. The agricultural value of the land is particularly high both along the coast on either side of St Andrews and extending some three miles inland and along the valley of the River Eden towards Cupar. An area along the Crail road at Easter Balrymonth, Kinkell and Kingask is classed 'B+' by the Department of Agriculture but is graded as of potentially the same value as the remainder of the coastal strip by the Macaulay Land Use Capability Survey.

53. Owing to the undulating topography and the incidence of high-class agricultural land no major opportunities for industrial or residential development were identified in areas detached from the existing settlements.

St Andrews

54. St Andrews serves much of the East Neuk and the northern part of Fife County. Its area of influence is limited by the proximity of Cupar, some ten miles to the west, and of Dundee, some thirteen miles to the north.

55. St Andrews has a higher proportion of historic buildings in relation to its size than almost any other Tayside burgh and the importance of its environment is nationally acknowledged. It is one of the two Small Burghs in Scotland given planning powers under the 1947 Act. The Burgh is dominated by the Cathedral ruins from which Market Street, North Street and South Street, all containing many seventeenth and eighteenth century buildings, extend westwards to form the commercial core of the town. The castle ruins are set on a headland to the north-east. University and school buildings flank the Cathedral and North and South Streets while the Royal and Ancient Clubhouse and the golf links which extend to the Eden estuary, are to the north-west as illustrated in Plate 5. In the present century residential extensions have been developed at South Haugh, beyond the Kinness Burn and also at Canongate to the south-west, while recent University

building has been at North Haugh, west of the Burgh. A particularly valuable asset is the skyline of spires and steeples which identifies the Burgh from a distance. New development must be carefully sited so as not to damage any well-known views.

56. The population of St Andrews differs significantly from that of the other Tayside burghs in having maintained growth for many years, apart from between the wars. In 1966 there were some 10,500 people and, principally due to net immigration, the population is likely to continue to increase. Two other characteristics, perhaps associated with the presence of the University, also distinguish the population from the Tayside average: first, a lower proportion in the under 15 age group, and secondly, higher percentage in the upper socio-economic groups.

57. Although administration, retail services and tourism are important in St Andrews, the University is the largest single employer. Manufacturing industry and employment in building and utility services, account for less than half the average for other Tayside towns. In 1966 almost 700 more people, or one in seven of the working population, entered the Burgh to work than residents left to work elsewhere.

58. The University proposes to increase the number of its students from 2,400 in 1969 to 4,000 in 1981 or so. Because of the need for staff and for ancillary employment the Burgh's population will certainly rise. An increase of commuting to St Andrews is also likely. A further possibility is the introduction of specialist firms in association with work done in the University; about seven acres of land for industry are the subject of an amendment to the Burgh's Development Plan. The Burgh has proposals for large areas to the west of the town to be used for the expansion of the University.

59. The Burgh's housing stock is generally of a high standard and the number of houses requiring replacement between 1971 and 1981 is only 150; this makes a lower proportion than for any burgh in Tayside other than Newport and Aberfeldy. Although the overall building rate since the war has been about the average in Tayside, 50% of the houses built between 1964 and 1966 were for owner occupation. There are about 400 people on the housing waiting list. An extension of the Burgh boundary was approved in 1967 and the amount of land zoned for housing in the Development Plan or in proposed Amendments, about 170 acres, would be sufficient for about 5000 people.

60. At present the water supply, which can serve areas below 150ft. by gravity, is insufficient to cope with much expansion. The Water Board will in any case be revising their arrangements for supplying eastern Fife in the near future and additional supplies should, therefore, become available. There need not be any difficulties in sewage disposal arising from expansion.

61. St Andrews has a good shopping centre, with a range of specialist shops, and attracts much trade from outside its boundaries. The town is not located on the primary regional road system and traffic congestion in the centre results more from the parking needs of shoppers and visitors than from the amount of through traffic. Although some roads suffer from overloading, particularly in Abbey Street, Bridge Street and Alexandra Place, improvements are either proposed or being carried out.

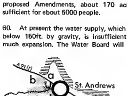
62. There are good facilities for sport and recreation with the renowned golf courses, the beach and Craigtoun Park. The Byre Theatre which is at present under reconstruction and two cinemas provide entertainment facilities. There is sufficient spare capacity in the secondary schools to support some increase in population.

63. While the University plans to expand and the local authority is aware of the implications there are restraints on the nature and direction of expansion caused by topography, by the high value of agricultural land and by the desirability of avoiding damage to the Burgh's unique character and environment. There is potential for the existing shopping and other facilities to cater for some years of increasing population.

Other Settlements

64. After St Andrews the two largest settlements in the area are Leuchars and Guardbridge, just north of the mouth of the Eden. The original linear village of Leuchars, on the A.919 almost midway between St Andrews and Dundee, has been extended by the important RAF station sited on the flat land beside the estuary. The Region's civil air services have been using the aerodrome. The total service and civilian population in 1961 was almost 1,900. Guardbridge situated where the estuary widens and turns eastwards, has some 950 inhabitants. There is a large paper mill. The noise from the aerodrome severely limits the expansion possibilities of both places. Strathkinness, sited on a ridge three miles west of St Andrews is a pretty village and Fife County Council have a proposal for limited expansion in an amendment to the County Development Plan. Blebocraigs, three miles further along the same road, is a scattered settlement with about 100 people on ground high about Dura Den. Boarhills and Kingsbarns are agricultural villages beside the A.918 Crail road, four and seven miles respectively from St Andrews.

Alternatives *(The letters refer to the Sketch below)*



St Andrews
Sketch

○ Existing urban area
▨ Residential
✱ Industry
U University (expansion)

65. In the present century expansion of St Andrews has taken place mainly to the south of the Burgh. Further building in that direction is, however, undesirable due to increasing congestion on the radial roads, to the steep slopes, difficulties of water supply and the effect on the landscape setting of the burgh. The new secondary school south of Lomond Drive represents the southernmost limit of expansion. As noted, it is proposed by the burgh that University expansion should take place at North Haugh to the west. Residential expansion to the south-east is restricted by the rising gradients and to the north-west (a) by the undesirability of extension on to the flat land adjoining the links. There is a possibility in the long-term for development in the vicinity of the Strathtyrum Estate (b). A major residential project would seem inappropriate, intervening between the University and the golf links. Development associated with the University might be a better long-term possibility.

PROPOSALS

66. We note the Burgh's outline proposals for University expansion to the west (U) and for residential development on the west (c) and south (d). In the latter direction, along the Kinness Burn, the existing open space could be extended in association with future residential development. Within the centre of St Andrews there is scope for action under the Civic Amenities Act to conserve the quality of the built environment.

67. Taken together, the land allocated in the Development Plan (paragraphs 58 and 59) and the Burgh's outline proposals for the area to the south-west of the town, provide space for 10,000 people. In the long-term growth situation, however, about 1,400 people would be displaced from the present burgh so that the net additional population might be 8,600. A further 1,400 people could live in Strathkinness and other small villages in the area. The assumed total increase of 10,000 people could therefore be accommodated. In Chapter 5, First Phase Development Potential, it is suggested that the St Andrews Area should grow by 2000 additional people in the period 1971 to 1981.

THE MONTROSE AND BRECHIN AREA

Characteristics and Potential

68. The Area under consideration contains the small burghs of Montrose and Brechin and its total population is about 25,000. The Area is defined in the northwest by the Grampian foothills, in the south-west by Aberlemno, and in the south by Montreathmont Forest. The area extends in the north-east to the River North Esk which is the boundary of the Tayside region. The influence of Montrose and Brechin extends beyond this boundary along the sea-coast towards Inverbervie and into the Howe of the Mearns, the fertile agricultural plain of Kincardineshire.

69. The main railway and trunk road to the north-east pass through Montrose; Brechin is on the main road through Strathmore. Economic growth in the core of the region could benefit the Area which already has well-established service industries. It is considered in Chapter 2 that, with some additional manufacturing industry the area could become the northernmost district of the city region and that the population could increase by 20,000 people.

70. Montrose has extensive areas of 'A' class agricultural land to the south, north and west. Brechin, however, has large areas of 'B+' land to the south and west although there are areas of A class land to the north, east and south-east. The major areas of woodland are at Montreathmont, at Edzell and at Inglismaldie, on the Kincardine side of the North Esk. The valley of the South Esk is well wooded and Brechin is well situated with the castle grounds to the south-west and Kinnaird Park to the south-east. Physical analysis of the area identified development opportunities in the vicinity of Montrose, and at Brechin, and in the general area between the two.

Montrose

71. Montrose, as illustrated on Plate 8, is sited on a sandy spit of land with the Basin to the west, the sea to the east and hills to the north and south. These features give the town a distinctive character which is attractive for tourism and recreation. The Burgh developed as a harbour town located on the main road between Dundee and Aberdeen and now provides services to much of north-eastern Angus and southern Kincardineshire. It is a handsome spacious town with an especially attractive High Street crowned by the 220 ft steeple of the Parish Church. In addition to the 11,000 people within the Burgh boundary there are some 2,250 outside (1961 figures) at Hillside and Ferryden.

72. The population of the Burgh stood at 16,000 in the late nineteenth century when textiles were an important industry in the town, but it had declined by 1911, since when it has remained generally stable. Work is available in food processing and in pharmaceuticals but the service industries are the more important part of the employment base.

73. Although Montrose is an attractive town in a beautiful setting it suffers from the High Street carrying heavy road traffic to and from Aberdeen. This situation will be alleviated by the improvements to the regional road system. (See Chapter 22). In addition re-organisation of the internal road system of the town may become necessary. The general condition of the burgh's housing stock is below the average for Tayside burghs. The rate of house-building between 1964 and 1968 was 46 per annum which is well below the rate required to replace the 800 houses which, it is estimated, should be replaced between 1971 and 1981. In the longer-term it is estimated that displacement owing to redevelopment and the formation of new households would be equivalent to 2,900 people, and 84 acres of new residential land will be required. Existing outline proposals for Montrose recently approved by the local authority provide for the housing of 3,000 people on the land north of the present built-up area.

74. In spite of recent improvements to the system, the water supply, which is drawn from Kinnaber on the North Esk, will have to be augmented from Loch Lee to meet current demands. Further supplies can be made available either by extension at Kinnaber or from Lochs

Lee or Lintrathen. Although the existing system of sewage disposal can be extended to serve an increased population it is probable that the resulting increase in untreated discharge will require the construction of an intercepting sewer. This project is, in any case, under consideration.

75. The town is well provided with social, recreational and educational facilities. The shopping centre benefits from the purchases of visitors and people on holiday; it could support a larger population without an increase in floor area. With respect to school buildings it is unlikely that there will be any spare capacity for secondary education beyond the provision to be made for current demands.

76. There do not appear to be any major physical difficulties in accommodating large-scale expansion in the general area of Montrose although the direction of growth will be decisively influenced by the topography.

Brechin

77. Brechin developed by a bridging point on the River South Esk at a junction between the Perth–Aberdeen road via Forfar and the main roads to Montrose and Arbroath. It was important as a Cathedral town in the Middle Ages and developed as an industrial centre in the nineteenth century. Although the town is well-sited on a slope above the river its centre is generally less attractive that that of other Angus towns in spite of possessing several interesting buildings. Traffic congestion in the town centre will be eased by the construction of the by-pass which is proposed by the County to the north-west of the town. In the longer-term a by-pass to the east of Brechin from the A.933 to the A.94 may become necessary.

78. The population reached a peak of about 9,000 in the late nineteenth century but had fallen below 7,000 by 1931. An increase between 1931 and 1951 was followed by a decline to 6,900 in mid 1966. There are a further 200 people outside the Burgh boundary. Almost half the manufacturing employment is still in textiles although the largest single firm in the Burgh is now in engineering. Many people, particularly women, travel to Stracathro Hospital to work. As in Montrose unemployment has been higher than the Tayside average.

79. General housing conditions in the Burgh are below the average for other Tayside burghs. Some 500 houses require to be replaced between 1971 and 1981 which, as a proportion of total stock is exceeded only in Dundee and Arbroath. However the Burgh has a vigorous building programme which amounted to 51 dwellings a year between 1964 and 1968. There is space for about 1,000 people on small sites in or adjoining the built-up area. But it is estimated that land will have to be allocated for 1,500 people displaced by redevelopment and the formation of new households.

80. The Burgh will in future draw water from Loch Lee and no problems in expanding supply should arise. Improvements to the sewage disposal system which are in progress should be sufficient to serve an additional 1,400 people. Expansion beyond that figure will require extensive additions to the system but no technical difficulties are anticipated.

81. Social, entertainment and recreational facilities are all adequate although the Burgh relies to some extent on Montrose. The shopping centre has capacity to provide for a larger population while as a result of the construction of a new school, there will probably be some capacity in secondary education after 1972.

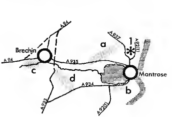
82. It is probable that if present trends continue the population of Brechin will slowly decline. There are, however no severe physical restrictions on its expansion. Brechin's future appears to be closely linked with that of Montrose.

Other Settlements

83. Edzell, six miles north of Brechin and with an aerodrome occupied by the US Navy nearby contains some 650 inhabitants. Other small villages exist in the area but none has any significant potential for expansion.

Proposals *(The numbers and letters refer to the Sketch below)*

84. Our local investigations showed that there is capacity in this area for the 20,000 people suggested in the Appraisal (See Chapter 2). Constraints to development imposed by topographical and other features are



Montrose Brechin Sketch

○ Existing urban area
▨ Residential
* Industry

considerable and no distinct alternative locations for development are presented. All the areas with potential will require to be taken up if the population increase proposed is to be achieved.

85. *North of Montrose* Development in this direction would include land for both industry and housing. Immediately to the north of the Burgh the land in form and location is most suitable for industrial development (1) and about 115 acres could be provided. If our other proposals are taken forward it would be appropriate to review the outline proposals by the local authority for housing development in this area.

86. The most appropriate residential area, in our view, lies further to the north on the south facing slopes which stretch westwards from Hillside (a). Houses for some 11,000 people could be built here in sequential development of residential groups with open views to the south and ready access to the new industrial area and town centre.

87. *South of Montrose* In order to avoid over-concentration of traffic on the road into the town centre a second direction of growth for residential development is suggested south of Montrose on the slopes of the Rossie Castle area (b). Growth here could accommodate some 4,000 people. Any significant development in this area should be deferred until the implementation of our road proposals which suggest a main regional route to the north west of Brechin. This would reduce the load on the bridges south of Montrose and help to remove through traffic from the town itself.

88. *South-west of Brechin* There is significant potential for development in Brechin to the south west of the town (c). Growth in this direction reaching to the river South Esk, could accommodate about 5,000 people and could be planned as an extension of the Burgh in conjunction with the line of the by-pass on the north. Potential for high quality residential development was also identified to the south east of the town in the vicinity of Kinnaird Deer Park. Development in this direction (d) would have the advantage of forming closer links with Montrose where the industrial and shopping growth may occur. It would, however, have a major impact on the existing high quality uses and landscape in this area and should be entertained only in the light of the very long-term possibilities mentioned later in paragraph 90.

89. Together with current Development Plan allocations the developments we suggest would provide houses for some 24,000 people with 115 acres of new land for industry. Allowing for the displacement of 4,400 people a net increase of 20,000 people with expended service facilities and space for industry could be achieved. Overall the growth should be seen as involving complementary development at Montrose and Brechin with the former providing the major industrial potential. With the exclusion of through traffic from the Burghs, both the centres could be expanded to provide district shopping services without losing their essential character. In addition a local shopping centre would be needed west of Hillside. Together with the development of the Montrose Basin suggested in Chapter 10, the area could become one of the most attractive districts of the city region.

Possibilities in the very long-term

90. In Chapter 4 (the Long-Term Potential) we consider the situation which might be reached at the end of the century if a rapid rate of growth in the order of 300,000 additional people has been achieved in the Region. Development possibilities in addition to those we have identified would then be required. Within the city region pattern as it might then stand we suggest several places where further growth might occur. The Montrose-Brechin area, in a strategic position on the regional road system and almost mid way between Dundee and Aberdeen, is put forward as one of these 'end of century' possibilities. A twin centred town could be envisaged developing out of our substantive proposals with arcs of development to the north and south of a central recreational park comprising the Basin and the Deer Park. The additional direction of growth (d) is shown on the structure sketch. We put this forward only as a long-term vision which should be borne in mind when decisions are being taken in the shorter-term.

THE BLAIRGOWRIE, COUPAR ANGUS AND ALYTH AREA

Characteristics and Potential

91. The area is situated in a strategic position with main road connections to Dundee, Perth, Aberdeen, Inverness and Deeside. In addition to Blairgowrie, the area considered includes the Small Burghs of Alyth and Coupar Angus. It extends to Ruthven on the east, Kinrossie to the south-west, and up to the foothills of the Grampians and Sidlaws. The population of the area is about 17,000.

92. The regional city patterns suggests that the area could be another centre of growth in Strathmore similar to Forfar. When brought within commuting distance of both Perth and Dundee and with ready access to ski-ing and other recreation facilities, the area could develop into a thriving district centre of the city region. The population increase considered appropriate within this regional context was 20,000 people.

93. The main landscape elements are the hills to the north-west and north-east from which the Rivers Isla and Ericht descend through wooded steep-sided glens before meandering westwards through the strath to join the River Tay at Kinclaven. Much of the flat land in the strath adjoining the rivers is poorly drained. To the west of Blairgowrie is an attractive area of lower, undulating foothills in which several small lochs are enclosed.

94. Much of the plain of Strathmore is highly fertile agricultural land, classed 'A' by the Department of Agriculture, although large areas of 'B+' land extend to the west and south of Blairgowrie and around Alyth. Blairgowrie is, however, the centre of raspberry growing in Tayside with fields clustering around the urban area and along the main roads. The main wooded areas are south-east of Hallyburton in the Sidlaws, Strelitz Wood

south-west of Coupar Angus and around Meikleour and Kinclaven at the confluence of the Tay and Isla.

95. Apart from areas adjacent to the three Small Burghs and Newtyle, the physical analysis showed that there were other potential residential areas on south-facing slopes, especially the foothills of the Grampians.

Blairgowrie

96. Blairgowrie comprises the two former burghs of Rattray and Blairgowrie and is sited on either side of the River Ericht. The population of Blairgowrie grew rapidly as textile works were sited on the river for water power, and it reached 7,000 in 1881. Since then it has declined to about 5,000. In addition almost 800 people live just outside the Burgh boundary.

97. Blairgowrie is a pleasant, substantially built town in a beautiful setting backed by steep hills, with the scenic asset of a river running through it (See Plate 7). Five main roads converge on the Burgh and there is traffic congestion in the central area. Construction of a by-pass would be difficult because of the gradients to the north, extensive development to the south and the need for a further crossing of the Ericht. The shopping centre already caters for the needs of a wide area and is capable of serving a larger population.

98. Manufacturing industry, especially textiles, is of declining significance in the Burgh. The service industries and in particular the distributive trades are relatively the more important. The numbers of workers commuting into and out of the town are approximately equal at about one-fifth of the labour force. The development of winter sports in Glenshee has extended the season and increased the Burgh's attractiveness to tourists and visitors. Blairgowrie Burgh wishes to promote an amendment to the Development Plan which would allocate about 80 acres of land for industrial use.

99. Housing conditions are not as good as might be expected from the high average rateable value and the high proportion, 37% in 1961, of owner-occupation. Some 200 houses will, it is estimated, require replacement between 1971 and 1981 but the local authority have a current building programme adequate for this. It is also seeking to have the development Plan amended to allocate 80 acres of land for housing. In the period from 1971 to the end of the century it is estimated that 1,100 people will be displaced from the present built-up area owing to redevelopment and the formation of new households.

100. Water is drawn from Loch Benachally. The supply could be augmented from Loch Lintrathen so that expansion will not cause any problems. Improvements being carried out to the sewage works should provide capacity for over 7,000 people in Blairgowrie and Rosemount. Further population expansion would require either major augmentation of the existing system or, if the present population is more than doubled, the construction of an additional system. There is, at present a problem of sludge disposal but a possible solution which is under consideration might also satisfy the needs of Alyth and Coupar Angus. There is a good provision of social, recreational and entertainment facilities, the Summer Folk Festival deserving special mention. It is proposed to build a comprehensive school to serve also Alyth and Coupar Angus but it is likely to be fully used shortly after its completion.

Coupar Angus

101. Coupar Angus is in the centre of the strath at the junction of the Dundee–Blairgowrie and Perth–Forfar roads and immediately to the north there is a ridge overlooking the River Isla. The Burgh contrasts strongly with Blairgowrie in lacking the larger burgh's speciousness and striking setting, but possesses instead an intimate small scale centre. Although traffic to Blairgowrie is diverted around the centre, traffic using the A.94 Perth–Forfar–Aberdeen road still passes through the town. A by-pass to the south of the Burgh is shown on the Development plan. Formerly Coupar Angus was of more importance than Blairgowrie but did not grow in the same way in the nineteenth century. The population has fluctuated at around 2,000 for seventy years.

102. In contrast to Blairgowrie manufacturing industry is relatively more important then the service industries. There are several enterprises which are ancillary to agriculture. Retail services are, comparatively, of less importance. Although, as in Blairgowrie, there is a balance of commuters in and out of the Burgh, approximately one in three of the total labour force travel out of the Burgh, almost half going to Dundee. This proportion of commuters may be related to the burgh's comparatively high proportions in the upper socio-economic groups. The local planning authority wish to have the Development Plan amended so that 13 acres of land can be allocated for industrial use.

103. Housing conditions and the average rate of house-building since the war are both below the average for Tayside burghs. It is estimated that 150 houses, a high proportion of the total stock, will require replacement between 1971 and 1981. The local authority has almost completed a scheme for 55 houses and has about three acres of land remaining for residential use; it is hoped to add five acres of land for housing by amending the Development Plan. In the longer-term, 1971 to 2001, it is estimated that about 500 people, requiring 20 acres of new residential land, will be displaced from the present built-up area owing to redevelopment and the formation of new households.

104. Water supply is drawn from the regional system and is sufficient for limited population expansion. Provision of a new sewage disposal works is under consideration but there will be a problem of sludge disposal (See para 100). Because of its proximity to Blairgowrie the Burgh does not possess more than purely local service facilities. Secondary education is to be concentrated in Blairgowrie.

Alyth

105. Alyth, like Blairgowrie, is backed by steep hills and the Alyth Burn, a tributary of the Isla, runs through the town. It was once larger than Blairgowrie and, although it was for a time during the nineteenth century when the textile industry flourished larger than Coupar

Angus, the population has now declined to about 1,750 and may continue to fall slightly. There are almost 180 people in New Alyth outside the Burgh boundary.

106. Agriculture, and industries ancillary to it, provide a significant proportion of total employment. The town also has a dormitory function, with over 40% of its employed resident population working outside the Burgh. On balance there is a net movement of over 200 people out of the town. There are about 7 acres of land allocated for industry on the Development Plan.

107. Post-war rates of housebuilding have been low. The proportion of houses requiring replacement in the period up to 1981 is also comparatively low although general housing conditions are less satisfactory than in many Tayside burghs. Sites amounting to 20 acres are allocated for residential use on the Development Plan. In the period up to the end of the century it is estimated that about 400 people, requiring 16 acres of housing land may be displaced by redevelopment and the formation of new households.

108. Because the Burgh is on a spur off the main Blairgowrie to Kirriemuir road there is little traffic passing through the town. However, in the older, higher part of the town there is some traffic congestion in the narrow winding streets. The small shopping centre is successful but other facilities are limited by proximity to and dependence upon Blairgowrie.

109. Neither the water supply nor the sewage system has capacity for much expansion. Provided this problem can be overcome there is scope for residential expansion at Alyth.

Other Settlements

110. There are ten other settlements in the area, ranging in size from 80 to 650 people, with a total population of approximately 2,200. Infilling and controlled expansion of these villages could provide a diverse range of residential opportunities for a limited number of people. At Newtyle there appears to be potential for growth for some 1,250 people.

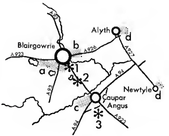
Proposals *(The letters and numbers refer to the Sketch below)*

111. There are several places in the area with good sites for groups of houses. However our regional analysis which initiated the local search for sites within the area for an increase of 20,000 people, also indicated that significant growth should be associated with existing facilities. The locations and directions of growth we propose therefore are associated with the existing burghs and main settlements, and are outlined in the following paragraphs.

112. *South and West from Blairgowrie.* In a westerly direction on the south of the Dunkeld road (A.923) first class residential sites (a) can be identified in the most appropriate expansion area adjacent to the Burgh. Development could stretch to the lochs which define the area on three sides, and could be connected to the existing centre without crossing the river. On the south, between the built-up area and Rosemount golf course, further high quality housing could be built. Developments in these two areas could accommodate some 13,000 people. By the construction of internal distributor roads as part of both developments, connections could be made to the Perth and Dundee roads, and to the future industrial areas (1 and 2).

113. *South-East from Blairgowrie.* We note the outline proposals of the Burgh for an industrial area (1) on the south of the town and the river beside the Coupar Angus road (A.923) extending to some 80 acres. This would be sufficient to provide employment for the proposed increased population in the burgh. Beyond this, further industry could be sited on an extension of this site or on flat land identified halfway between Blairgowrie and Coupar Angus (2) south of Stormont Loch and near the junction of the A.923/A.984. This latter site could extend to some 155 acres but should only be taken up when the site immediately to the south of Blairgowrie is fully developed.

114. *East of Rattray.* Because of the hills to the north of Blairgowrie the only remaining possible direction of growth is in an easterly direction from Rattray (b).



Alyth Blairgowrie
Coupar Angus
Sketch

○ Existing urban area
▨ Residential
✱ Industry

Expansion here is however, limited by the capacity of the bridge within the Burgh and by the value of the land in this area for raspberry growing. We note the Burgh's outline proposals including an approved amendment for some 2,000 people in this area and would recommend that this should be the limit of growth in this direction.

115. *South-West from Coupar Angus.* On the south-west of the town and north of the Perth road a site (c) can be identified for some 3,000 people. In addition, to the south of the Perth road a site (3) for industry which would serve a wider area can be identified, the context and purposes of which are mentioned in Chapter 4. It is recommended that this site should be taken up only if demand arises for appropriate types of industry, related for example to agriculture.

116. *East and West of Alyth and in the Vicinity of Newtyle.* Sites (d) for limited expansion of these places, can be identified which in the long-term could accommodate about 4,000 people.

117. The effect of proposals referred to in paras 112 and 116 on the centre of Blairgowrie would be considerable. A by-pass to the east of the Burgh would be necessary, not only to cater for the increase in traffic within the district, but also to remove the through tourist traffic. Given this by-pass the services and shopping in the centre could be expanded. Potential is limited however and particular attention would have to be paid to the provision of local shopping facilities in the expansion area on the south and west.

118. The total population which could be accommodated by these proposals could amount to some 22,000 people. Of these some 2,000 would be relocated from within the existing built-up areas and therefore the popuation increase suggested by the regional analysis of 20,000 people can be achieved. In addition some 80 acres of industrial land can be made available with possibilities of increases beyond this.

119. The area could thus be developed into a most attractive district within the city region. Of all the districts in the emerging city region pattern it would be the one closest to most of the remote areas, the ski slopes and other major outdoor recreation attractions. Growth in the activity and employment in Blairgowrie could well develop from the increase in tourism and leisure pursuits while attraction of industry to the district together with decreasing travel times from Perth and Dundee could lead to further growth in the area.

THE CUPAR AREA

Characteristics and Potential

120. Although it is neither the largest town nor in a central position in Fife, Cupar has long been the county town and administrative centre. It serves the predominantly agricultural area of northern Fife although its area of influence is limited by the proximity of St Andrews ten miles to the east and Dundee eleven miles to the north. The Cupar Area is defined here as extending southwards to Craigrothie including Ceres, eastwards to Dairsie, northwards to Luthrie and westwards to Springfield. The Howe of Fife, which has a close relationship with the Burgh, is described in Chapter 27. The population of the area is about 11,000.

121. The regional appraisal, Chapter 2, envisages Cupar as a district within the city region which could be stimulated to expand by the growth of Dundee, end by reason of its location as an intervening opportunity midway between Dundee and industrial Fife. The population increase envisaged is 10,000.

122. The landscape of the Cupar area is defined by the valley of the River Eden and the bordering hills. To the west the valley opens out into the Howe of Fife. The hills steepen to the north-west and the south while to the north the country is more undulating.

123. Large areas of 'A' class agricultural land extend to the north-west and north-east of Cupar whilst to the south and east the land is mainly 'B' class with patches of 'B+'. Some raspberry cultivation is undertaken around Balmullo. The main wooded areas are at Kemback, to the east, overlooking Dura Den, and to the west at Springfield, Crawford Priory and Edensmuir Forest in the Howe of Fife.

124. Areas of flat land suitable for industrial use are located immediately to the east of Cupar and in the vicinity of Springfield. Residential opportunities occur between Cupar and Springfield to the wast; there are others on the south-facing slopes of the Ochils to the north and west of Cupar and on the southern slopes of the Hill of Tarvit.

Cupar

125. Cupar is sited on the gently sloping north bank of the River Eden in a valley dominated by the Hill of Tarvit to the south which rises to almost 700 feet. After reaching a population of over 5,000 in 1871 it dropped slowly until 1921 since when it has risen steadily to its present level of about 6,000. A very high proportion of the working population are in administration, retail services and firms related to agriculture. In 1966 some 1,820 people or almost half the labour force, lived outside the Burgh boundary. Although about 960 residents have jobs outside the Burgh a large proportion of this may be accounted for by the proximity of Stratheden Hospital and the British Sugar Corporation's beet factory nearby. Future employment depends, among other things, on the results of any proposals for local government reorganisation and on the prosperity of agriculture. Since 1960 unemployment rates have risen and the town will be seriously affected by the impending closure of the beet factory. About 7 acres of land are allocated for industrial use on the Development Plan but more will be put forward as part of an amendment.

126. The town, built mainly of the local golden-coloured stone, has a particularly attractive centre and maintains a high standard of environment. (See Plate 8). It has good communications, being situated on the A.92 road between Dundee and Kirkcaldy. In spite of the convergence of four main roads upon it the town does not suffer from such severe problems as other towns built on the radial pattern. There are problems of congestion in the centre but the construction of an inner

ring road with associated car parks and pedestrian shopping streets is proposed by the local planning authority. A long-term possibility of a northern by-pass is also envisaged.

127. Housing conditions are in general very good. Only 150 houses will require to be replaced between 1971 and 1981, which gives one of the lowest proportions for any Tayside Burgh. Between 1971 and 2001, 1,250 people could be displaced from the present built-up area owing to redevelopment and the formation of new households. There is a little land available for building at present, but the local authority envisages an amendment to the Development Plan which would allocate 170 acres of land for residential development, enough for 4,250 people.

128. The water supply derived from Clatto Reservoir is sufficient for present needs and has to be augmented from the general system of the Fife and Kinross Water Board. Although it can provide for a limited amount of growth, additional expansion will require considerable development of the Board's system. A new sewage disposal works, recently completed, serves the existing population and could be extended to serve a further 3,000 people.

129. Social, recreational and entertainment facilities are generally satisfactory. The Burgh contains the Elmwood Agricultural Training College, which is to be expanded, but relies on Dundee and Kirkcaldy for other further education facilities. There is not expected to be any spare capacity in secondary schools.

130. The direction of growth of Cupar is determined by the topography and by the location of the sewage works and the railway. Within these limits there is however considerable potential for growth provided the internal road system can be successfully modified.

Other Settlements

131. There are eight small settlements in the area ranging in size from 100 to 700 people, with a total population of 2,000 people. Development and rehabilitation has proceeded in these villages and it is proposed by the County to increase the size of Ceres from about 600 to 950 people. Expansion of other settlements is however limited by the availability of services and facilities.

Proposals *(The number and letters refer to the sketch below)*

132. *Directions of Growth.* The regional appraisal (see Chapter 2) which initiated the local search for development potential within the area envisaged an increase of some 10,000 people, most if not all of which would be sited in association with the Burgh. Beyond the expansion envisaged by the local planning authority the possible directions of growth are limited by the river, the railway and the rising ground to the south, the line for the by-pass to the north and difficulties of foul water drainage to the east where pumping back to the existing sewage works would be involved.

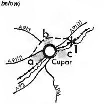
133. *South-West of Cupar.* A major possibility for growth therefore lies in this direction between the Auchtermuchty road (A.91) and the railway. Development for some 6,000 people in this area (a) is possible and could be linked with industrial development on flat land near Springfield. A new local shopping centre would be required to serve the additional population.

134. *North and South-east of Cupar.* We note from the proposed revision of the Cupar Development Plan that residential development is proposed between the town and the suggested line of the by-pass to the north (b). An extension (c) to the south-east is also proposed. About 4,000 people could be accommodated in these areas.

135. *North-east of Cupar.* In this direction the local planning authority intends to amend the Development Plan to allocate about 18 acres for industrial use. Farther to the east is the sugar beet factory which, if it becomes available, could be redeveloped to provide about 60 additional acres of industrial land. Thus a total of about 80 acres might eventually be developed for industry.

136. Development for some 1,000 people can be seen occurring in the village of Ceres and other small settlements. This would have to be carefully designed and limited within the local plans as they are worked out.

137. In summary it can be stated that residential sites, for 11,250 people could be developed in this area. From these sites land would be required for 1,250 people displaced from the present built-up area, leaving space for an additional 10,000 people envisaged in the regional appraisal. Sites for industry in the immediate vicinity of Cupar are limited but, given its continuation as an administrative centre, there should be no physical difficulty in providing employment opportunities for the addition population and within reasonable distance for travel to work.



Cupar
Sketch

○ Existing urban area
▨ Residential
✱ Industry

27 The Highland and Rural Areas

1. In this final chapter of local investigations we turn to the rural hinterland around the core area of the city region. These areas will have a vital part to play in the emerging pattern of the city region, and will be complementary to the more concentrated urban growth in the central core. Within this regional context our investigations have been directed towards future changes which could arise from two separate sources.

2. On the one hand these areas can be seen as the potential playground and wide-open spaces for the people living within the whole region and indeed, with the improvement of communications, for the whole of the Central Belt of Scotland. On the other hand the agricultural and forestry assets will have to be protected.

3. The regional road network proposed in this report and road improvements outside the region such as the Edinburgh–Perth motorway (M.90) and the East Fife regional road, will bring most parts of the region within one hour's driving time of 750,000 people who might be living within the region at the end of the century and within two hours of Glasgow and Edinburgh. In Chapter 10 on Recreation and Tourism we deal in some detail with the pressures that could result from the increases in population, mobility, and leisure time which will lead to increasing demands for recreation and holiday space. This has given us some idea of the demands which could fall on the rural areas over the next 30 years and in our reports on these local investigations we summarise the overall planning policies that may be appropriate to deal with these.

4. The second source of change arises from the trends in the areas and communities themselves. These are dealt with in detail in the Part II chapters, particularly those on Agriculture, Employment, Population, Education and Health where they are reviewed within the total regional context. Changes in individual areas and communities have been considered and policies proposed where appropriate.

5. It can be seen therefore that for these areas our local investigations have taken a somewhat different form from those in the preceding chapters. A detailed analysis of land use potential was not undertaken since the siting of a significant increase in population based on the attraction of industrial employment was not involved. The analysis has however been directed as we have suggested towards those policies which would arrest decline while striking a balance in the future between exploitation and conservation of the natural resources and environment of each area.

6. While dealing with the characteristics and potential of each area we do not as before conclude with proposals for the direction of growth but attempt to summarise the prospects and appropriate planning policies. Individual figures for future population increase are given for each area but should be treated with reservation since much will depend upon circumstances outside the region. We have mentioned specific figures partly to give some idea of the scale of future demand and partly to set out the assumptions used in the regional traffic analysis.

THE HIGHLAND AREA

Characteristics and Potential

7. Highland Tayside comprising the northern and western half of the region has an area of some 1,700 square miles, about half being above 1,000 feet. Its present character is closely related to its physical characteristics. The scenery is very attractive and provides opportunities for sport and physical recreation. (See Chapter 10 – Recreation and Tourism and Plate 9).

8. In 1966 there were about 29,000 people living in the area mainly in the river valleys, and principally in the communities of Pitlochry, Aberfeldy, Dunkeld, Killin and Blair Atholl. The population has been declining at a steady rate for a very long period. The trend may be illustrated with the figures for the Highland district of Perth County which show a drop of two-thirds from over 25,000 in 1801 to some 8,200 in 1961. The principal reason for the steady migration from the area is the changing pattern of farming. The falling demand for agricultural labour has not been replaced by other employment opportunities within the area. One out of three workers is still employed in agriculture and other primary industries.

9. Recent figures suggest that this long-term decline may have stopped. The mid-year estimate of population for 1966 for the Highland District of the County of 8,310, shows a slight increase since 1961. This may be accounted for by the fact that the service centres have prospered owing to an increasing tourist trade. In the eastern part of Perthshire and the Highland areas of Angus the decline appears to be continuing.

10. Apart from those provided in Pitlochry and Aberfeldy there are only limited shopping and service facilities in the Highland area. For anything other than their daily needs people in the western sections have to travel to these two burghs or to Perth. The people living in the Angus glens look to the Strathmore towns.

Pitlochry

11. Pitlochry is situated in the narrow valley of the River Tummel and is built mainly on south-facing slopes set within steep-sided, well-wooded hills. This situation strongly affects the character of the town; the main road and railway thread their way along the flat land bordering the river, and the shopping centre is arranged

along both sides of the main A.9 road.

12. The population of the Burgh has been stable since the war and increased slightly to about 2,500 between 1961 and 1966 owing to immigration. This tendency has been based on service industry which occupies 72% of the working population. The majority of these are employed in tourism and the seasonal nature of this employment base is a problem. To attempt to remedy this 5 acres of land have been allocated in the County Development Plan for industrial use.

13. Housing conditions are generally good in Pitlochry and a local authority scheme for the construction of 60 houses will meet the short-term needs of the community. There is a demand for land for private housing but only a limited supply of sites is available in the burgh. In the longer-term 200 houses are estimated to require replacement and 12 acres of land will be required to house displaced population.

14. An ample water supply comes from river sources. However, owing to lack of reservoir and mains capacity, shortages occur in summer when the population of Pitlochry may be three or four times higher than in winter. The sewage treatment works are overloaded and the provision of new works is under consideration.

15. The town centre of Pitlochry is heavily congested at peak periods due to the conflicting demands of tourists, residents and through traffic. Although the line for a by-pass has been recommended by the County Council midway between the railway and the river, the date for construction has not been fixed. Parking facilities for the town are being increased but it is difficult to find sufficient central sites.

16. In addition to shops, there is a cinema and the Pitlochry Festival Theatre (both of which are open only in the summer). The town hall is in use for dances most nights of the week in the holiday season. Although there are tennis courts, a golf course, bowling greens and sailing, a recent study has suggested that there is a need for indoor recreational facilities.[1]

Aberfeldy

17. Aberfeldy is situated on the Tay some 6 miles east of Loch Tay at the junction of the road from Ballinluig to the loch with the road from Crieff via the Sma' Glen. To the north the town slopes down to the river while on the south it is hammed in by steep slopes. Aberfeldy is the service centre for the upper Tay and much of Highland Perthshire.

18. After 50 years of slow decline the population increased slightly owing to immigration from 1961 to 1966 when the population was about 1,500. Like Pitlochry the population is elderly compared with other burghs in Tayside.

19. With 80% of employment in service industry Aberfeldy is even more dependent than Pitlochry on seasonal trade and the advent of light manufacturing industry to the town would be welcomed by the local authority. About 4 acres of land are allocated for industrial use on the Development Plan.

20. Since the acquisition of the site of the former railway station and goods yard, the local authority have land for 60 houses which is the size of the current waiting list. In the longer-term it is estimated that 150 houses will need to be replaced and 9 acres of new land will be required. There is a demand for private housing within the Burgh but land is not allocated on the Development Plan for this purpose.

21. With regard to water supply, Aberfeldy does not suffer from the same extreme seasonal variation as Pitlochry but has the same problem of insufficient storage. The present sewage works is obsolete and new works are being designed to provide for a population of about 3,000.

22. The town centre is a potentially attractive winding street passing through a central square, which consists of properties of uneven quality and much of the area is used for car parking. In addition to its shopping facilities Aberfeldy has a cinema which, unlike that of Pitlochry, is used throughout the year. The school and town hall are used as meeting places for groups and there are about 40 social organisations in the town. There is a 9 hole golf course to the north of the town and an 18 hole course at Taymouth Castle, five miles to the west. There appear to be opportunities for increasing the amount of boating on Loch Tay. Improvements are at present being made to the park, the Birks of Aberfeldy, on the wooded slopes south of the town.

Prospects and Policies

23. It is unlikely that developments in agriculture, forestry, estate work or even tourism will do much to stem the outward flow of people from the more remote settlements. Future policies should therefore be directed towards the burghs and selected settlements where the further growth of tourism could be the basis for arresting decline and promoting development.

24. In the western part of the area, particularly between Dunkeld and Pitlochry, the most important future change will be the improvement to dual carriageway standard of the A.9 together with a by-pass of Pitlochry. This will lead to an increasing demand for hotel accommodation, for an expansion of outdoor activities in the area and, equally important, for the provision of indoor recreational facilities. Thus Pitlochry, from its existing strong base, could keep in the forefront as one of the major tourist centres in the Highlands. Much work and enthusiasm has already been devoted to the locality and it is clear that a local plan, drawing all this together, which would promote and control future development, will be necessary. Further east, the potential in the Angus glens we have already discussed under Recreation (Chapter 10) and an analysis of Glen Clova has been carried out in some detail. Similar work was carried out in the area north-east of Dunkeld. This shows that following further similar detailed investigation it would be possible to draw up

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[1] 'A study of the Tay and Tummel Valleys' Duncan of Jordanstone College of Art

policies for the development of recreational areas and for the controlled expansion of existing settlements which would allow the use of these areas to be kept in balance with their environmental character. The preparation of Tourist Plans would provide a useful framework in which to draw up detailed plans and policies.

25. In addition to the policies required for the promotion and control of recreation, demand for second homes for holidays, weekends and in anticipation of retirement, which is already evident in the area, could well increase as the rate of second home ownership is comparatively low in Britain. (See Appendix to Chapter 10). This demand covers a wide spectrum from caravans to high quality individual houses, in addition to the renovation of existing dwellings. Typical new sites where these could be located are discussed in Chapter 10.

26. For all forms of residential development there are suitable sites and opportunities that could be made available at Aberfeldy. Pitlochry, however, has at present limited possibilities due to difficulties over water supply and congestion in the main street. Once these have been overcome further expansion is possible within the limits set by the topography. In the southern-most part of the area, particularly at Dunkeld, there are also opportunities to provide attractive holiday homes and housing for commuters working in the major centres of Tayside.

27. Taking the Highland area as a whole an additional population of 2,000 has been assumed in the long-term. In view of the particular attractions of the Pitlochry–Dunkeld–Aberfeldy area and its location on the main Highland road and railway route, we have considered whether, by the end of the century, this area would come under demand for the kind of residential development described in paragraph 25; whether this could be accommodated, or whether policies for conservation or limitation of growth should be recommended. Our investigations show that a demand might well evantuate and that it could be accommodated in a series of small settlements in the valleys of the Tummel and the Tay, centred perhaps on Ballinluig, provided that a sensitive and carefully phased development plan could be achieved.

STRATHEARN

Characteristics and Potential

28. The River Earn rises a few miles to the west of the regional boundary and flows for 40 miles to join the Tay some 6 miles downstream of Perth. Through most of its course it runs through the fertile Strathearn. The principal settlements are the burghs of Crieff and Auchterarder and there are several smaller places which act as the local centres of their immediate areas.

29. Strathearn has not experienced such severe depopulation as the 'Highland area' previously described. Although population figures show a decline over a long period the figures for 1961 and 1966 for the Burghs and the Central District of Perth County (which is nearly equivalent to Strathearn) show a rise from 16,600 to 17,200. The main occupations are in agriculture and service industries, less than 15% of the population being in manufacturing employment compared with the average of almost 40% for Tayside as a whole. Approximately one-third of the employed population work outside the area; about 350 travel daily to Perth.

30. The area has magnificent scenery ranging from the steep mountians and and wooded glens around Loch Earn to the expansive rolling coutryside east of Crieff. Gleneagles, with its well known hotel and golf courses, and Crieff are the main tourist centres. The principal resource is, however, the soil, and Strathearn is a prosperous farming area. Crieff and Auchterarder are the main service centres. Like the Highland area of Perthshire, Strathearn looks to Perth as its regional centre.

Auchterarder

31. The Burgh of Auchterarder is sited on the A.9 trunk road between Perth and Stirling, (See plate 10). After rapid growth in the nineteenth century to a peak of 2480 in 1861 the population declined. In spite of immigration there was a slight decline between 1961 and 1966 when the population was about 3,400. The population is somewhat older than the Tayside average.

32. Auchterarder differs from Crieff, Pitlochry and Aberfeldy, being less dependent on service industries, although these are still relatively important. Some 30% of its employment is in manufacturing and 65% in services. Auchterarder, in contrast to the other burghs of Strathearn and the Highland area, is to some extent a dormitory town, approximately half those who work elsewhere travelling into Perth. There are 5 acres of land allocated for industrial use on the Development Plan.

33. Owing to a high level of activity since the war housing conditions in Auchterarder are now good. The current housebuilding programme by the local authority should cope with most of the waiting list but, for the longer term, it is estimated that 200 houses will require replacement between 1971 and 2001, 12 acres of land being required for displaced population; only about 4 acres are allocated for residential use on the Development Plan.

34. The present water supply is adequate but plans are well advanced to supply Auchterarder from Loch Turret. The sewage disposal works are considered adequate and able to support a population of 3,000. A by-pass of the town is to be built during the 1970s as part of the improvement of the A.9 trunk road and this should improve conditions in the town centre.

Crieff

35. Crieff is located on steep southfacing slopes overlooking Strathearn about eleven miles west of Perth on the road to Lochearnhead and at the junction with the road north to Aberfeldy via the Sma' Glen. The town enjoys a mild, dry climate and is set amidst superb scenery.

36. The rapid population growth of Crieff during the early nineteenth century was based on small scale industry. Subsequent industrial decline was offset by the town's development as a holiday and retirement centre. Owing to immigration, the population increased to about 5,600 between 1961 and 1966. 71% of jobs are in service industry, the major source of employment being in

retailing and hotels; there are more hotels in Crieff in relation to population than in most towns in Tayside.

37. Although services are its main activity, Crieff has attracted several manufacturing firms in recent years and about 4 acres of land remain allocated for industrial use on the County Development Plan.

38. Housing conditions in Crieff are good and the schemes are in hand for tackling the short-term problem of the waiting list. It is estimated that 600 houses will require replacement between 1971 and 2001 and 36 acres will be required for displaced population.

39. Crieff has ample water supplies but its sewage works are inadequate. An improvement scheme for sewage disposal has been designed which would allow the population of the burgh almost to double but construction has yet to commence.

Prospects and Policies

40. That Strathearn has not suffered the same degree of depopulation as the Highland area may be attributed to its richer farming resources and its more accessible position in relation to the main population centres of the region and to the adjoining areas to the south. These two factors give a key to the future prospects and appropriate policies for the area. On the one hand conservation of agricultural resources will be important and on the other policies for promotion linked to improved accessibility should be devised.

41. Although a further reduction of agricultural employment may be expected the effects may well be offset by the following factors: improved accessibility to the larger employment and service centres, the attraction of small industries to these centres, and the trend for commuters and retired people to live in the burghs and larger villages will all help the local economy and provide a complement to agricultural production. On this basis, and for purposes of regional traffic analysis, a long-term population increase of 10,000 has been assumed. Planning policies should be drawn up as part of the Development Plans for the conservation of the agricultural areas together with local proposals for roads and lay-bys which will cater for the touring visitor.

42. The second category of policies for the area will arise from the construction of the A.9 to dual carriageway standard and here Auchterarder and, to a lesser extent, Crieff will benefit from improved accessibility. Again, increased demand for commuter and weekend homes and houses for retired people will occur and local plans for the phased implementation of this type of development will be required. On the east of the area the construction of road improvements, including the motorway M.90, will give improved access, and demands for similar types of development may also occur.

43. In the same way as we considered whether the Pitlochry area could respond to considerable demands at the end of the century, we also noted that the Auchterarder area could come under similar pressure, standing as it does at the gateway to the Region and approximately half-way between Perth and Stirling. One demand could involve a significant increase in residential accommodation of all types. Another demand might be for a major industrial site, serving the whole of the region and the area to the south for agricultural processing or other operations which should be sited away from urban areas. This particular area could meet both these demands and we suggest in Diagram 7 (long-term development potential) that residential areas could be found between Auchterarder and Crieff and a substantial industrial site could be located between the former and Dunning.

THE HOWE OF FIFE

Characteristics and Potential

44. One of the lowland basins of Tayside is the Howe of Fife, an area of level, fertile farmland extending some 10 miles from Strathmiglo in the west to Cupar in the east, and 5 miles from Collessie in the north to Freuchie in the south. This plain is crossed by the main road and rail routes between Dundee, Kirkcaldy and Edinburgh.

45. The boundaries of the Howe of Fife do not correspond exactly with local authority or statistical areas. Taking the nearest equivalent area, the civil parishes of Strathmiglo, Falkland, Kettle, Auchtermuchty, Collessie and Monimail, a situation characteristic of an agricultural lowland area lacking any major industrial settlements emerges. For over 100 years up to 1961, the population has declined steadily owing to a decrease in agricultural employment. This movement has not been counterbalanced by any significant urban development, although just to the south of the Howe is the expanding Kirkcaldy/Glenrothes area. In the years 1961 to 1966 the population of the Cupar District of the County, which includes most of the rural area within the Howe of Fife fell from 13,000 to 12,500.

46. Agricultural land is the main resource in the area, and apart from the Burgh of Falkland and the magnificent rural scenery, the Howe of Fife does not possess any special attractions for the visitor. However the Lomond Hills, immediately to the south of Falkland, provide good opportunities for outdoor recreation and have been closely examined in the Fife County Tourist Plan.

47. The centres in the western part of the Howe of Fife are Auchtermuchty and Ladybank. The eastern part is within the catchment area of Cupar, the county town. The other principal service centres for the area lie outside at Kirkcaldy, St Andrews, Dundee and Perth.

Ladybank

48. Ladybank is located in the centre of the Howe of Fife, with good road and railway communications north and south. After a period of rapid growth in the nineteenth century the population has been declining; in 1966 it was about 1,200 people. About 150 houses will require replacement in the long-term. Including gap sites, about 20 acres of land are allocated for residential use on the Development Plan.

49. In recent years there has been a decline in railway employment which was formerly the mainstay of Ladybank's economy and the level of employment has

been higher than the Tayside average. In comparison with Tayside a relatively high proportion of employment is in services and a low proportion in manufacturing. Nearly 50% of the resident workers travel to other places for work, and the inward movement of labour is much less than this outflow. Taking into account former railway workshops, some derelict sites and land straddling the burgh boundary, some 50 acres of land could be made available for industrial use but the Development Plan would have to be amended.

50. Ladybank has a small shopping centre but not much in the way of entertainment facilities. An 18 hole golf course lies just outside the town.

Auchtermuchty

51. Auchtermuchty is situated at the junction of the A.91 road from Milnathort to Cupar with the A.83 Falkland to Newburgh road. The site of the town is on gentle south-facing slopes backed by the Ochil Hills, as illustrated in Plate 11, and there are fine views across the Howe to the Lomond Hills. Like other towns in the area, particularly Newburgh, the population fluctuated in the 19th century with the fortunes of industry. The population level has been stable for about 50 years and was about 1,360 in 1966.

52. More people leave the Burgh to work than come in, and, although published statistics show little unemployment, female activity rates are very low. A higher than average proportion of the population are employed in manufacturing. There are two firms of iron-founders in the town one of which also specialises in the production of weighing machines. There is also some hosiery maufacturing.

53. Housing conditions are quite good and there has been a reduction in house construction in recent years. In the longer-term, 1971 to 2001, it is estimated that 150 houses will require replacement. The main A.91 road divides the town and is very narrow; a plan to by-pass Auchtermuchty is contained in the County Development Plan and this would improve its environment.

Falkland

54. Falkland is in the south-west corner of the Howe of Fife, nestling at the foot of the Lomonds with views northwards to the Ochils. It has good road connections, by the A.912 and A.983, to the south and east. In its buildings and in the thirteenth century palace the Burgh still provides a pleasant environment of architectural importance comparable with the best of the historic Scottish burghs.

55. In 1961 the population was 1,050 but by 1966, following factory closures it had dropped to 950. However the employment situation has recently improved. There is very little overcrowding and housing standards are generally good. In the longer-term, 1971 to 2001, it is estimated that about 150 houses will require replacement. Land allocated for housing could accommodate about 30 houses.

56. In 1966 a higher than average proportion of Falkland people were employed in manufacturing and a lower proportion in service industries. In spite of the small amount of service employment and the few retail outlets in Falkland itself, there is a high proportion of women in employment. This is in contrast to the low proportion in Ladybank and Auchtermuchty.

Prospects and Policies

57. The Howe of Fife is predominantly an agricultural area and its largest urban settlement has fewer then 1,400 people. the area is thus dependent for many essential services and facilities upon surrounding towns, of which Cupar is probably the most important. The area is separated from other places by the encircling hills, and any growth of Cupar should strengthen its hold over this catchment area and give the people an improved district centre. Future prospects and policies will therefore be concerned with improving and protecting the agricultural economy, including forestry, while promoting the recreational and tourist opportunities presented by the Lomond hills and the historic town of Falkland.

58. The Howe lost population as a result of the general decline in agricultural employment, the contraction of railway employment at Ladybank, and the closure of small industrial firms as in Falkland. The Howe of Fife has generally good accessibility to major towns. The building of the M.90 motorway will improve access to the western part of the area and improvement of the link between the Tay and Forth should help the eastern part.

59. In general all the urban settlements of the area could provide good sites for limited development and might well gain considerably in the future from the expansion of employment in the adjoining areas. It has been assumed that the population of the area might increase by some 3,000 people in the period 1971 to 2001.

60. As in other areas we have looked for sites with development potential that could be expected if certain demands grow more than can be foreseen at present. In this context a major industrial site could be identified at Ladybank on land which is not high agricultural quality. It would benefit from the railway and the improvement of A.914 but detailed site investigations would be required. The possibility is shown on Diagram 7 (long-term development potential). We note in Chapter 4 that development would influence the regional economy to the south, and suggest that any proposals for developing it should be considered in relation to the Central Fife planning strategy.

THE EAST NEUK OF FIFE

Charcteristics and Potential

61. The East Neuk of Fife is the coastal strip in the extreme south-east corner of the Region. For our purposes it has been taken to extend from Fife Ness to Lundin Links and to contain the ancient burghs of Crail, Anstruther, Pittenweem, St Monance and Elie and Earlsferry together with Upper Largo, Lower Largo and Lundin Links. The East Neuk settlements have many social and economic problems in common though each has its special features.

62. The East Neuk is an area of gently undulating country at the western end of which stands the high mass of Largo Law and a portion of the higher plateau of the interior of Fife. Inland, between the coastal strip and the southern edge of the Howe of Fife, there is an area of hilly wooded country containing attractive villages and farms.

63. The small burghs of the East Neuk are concentrated into a very short stretch of the coastline. (See Plate 12). One point of note is the proximity of the chief settlements to each other and to the Leven–Methil complex to the south-west; only 18 miles separate Leven and Crail, the farthest east of the burghs. Each burgh displays a strong individual character as a variation on the common theme of a cluster of robust buildings, of honey coloured stone and red pantiles, focussing on a small harbour with massive stone quays.

64. The area had less than 12,900 inhabitants in 1966 as against over 13,400 in 1961. Population decline has been continuous, even in the burghs, and is in contrast to the situation in most other Tayside burghs. An overall downward trend can in fact be traced over much of the present century. The distribution of population, apart from small hamlets and estates, is in two distinct types of settlement. The small burghs have populations of between 1,010 (Crail) and 2,740 (Anstruther, Easter, Wester and Kilrenny) and are located on the south-east facing section of the coast. Included in this group are the contiguous villages of Lower Largo and Lundin Links, with a combined population of 1,560 in 1961. Other villages have populations of between 90 and 450 and are located inland, usually associated with areas classified as first-class agricultural land.

65. There is no dominating centre in the East Neuk although Anstruther provides the principal administrative and commercial services for the area. It would appear that Anstruther, Crail and Pittenweem tend to look towards St Andrews whilst the other burghs look to Leven and Kirkcaldy. The area contains one junior and senior secondary school, Waid Academy, Anstruther, which also acts as the further education centre. Kirkcaldy and St Andrews provide hospital facilities. The East Neuk is well endowed with facilities and organisations for youth. There are also excellent recreational opportunities with golf courses, beaches and great potential for sea angling.

66. One of the significant trends affecting the general situation in the East Neuk is the decline of employment in primary industries. As in the case of the Region as a whole (see Chapter 13) employment has declined in agriculture which in the East Neuk is dominated by cereal production, especially barley. More important is the past decline in employment in the fishing industry which is centred on Anstruther, Crail, Pittenweem and St Monance; however the industry still supports 400 men at sea and 300 full-time jobs on shore and these numbers have been stable in recent years.

67. Manufacturing is of declining importance in the East Neuk, the two most important industries being boat-building (St Monance and Anstruther) and textiles (foul weather clothing) in Anstruther. Throughout the 1960s there was a decline in employment and there are no signs that there will be any significant growth in the near future. There are small industrial sites allocated at Anstruther and St Monance.

68. The other significant trend affecting the general situation in the East Neuk is the growth in the tourist industry. Tourist expenditure is estimated at £760,000 in the area during the relatively short summer season. Some 7–8% of the labour force are employed in hotels and catering, and it is estimated that, together with indirect employment, some 17–20% of total employment comes directly or indirectly from the tourist trade. Crail and Elie have the largest proportion of boarding-house accommodation and of furnished houses for renting. The Anstruther holiday camp is estimated to house 2,500 people in the peak season, 60% of the total accommodation for over 4,100 visitors to the East Neuk. There are also small caravan sites at Crail, St Monance and near Elie.

69. The East Neuk caters mainly for the 'traditional' holidaymaker, and its appeal has been overwhelmingly to the population of the industrial west of Scotland. In 1968 the County Council published proposals for the development of tourism which included the idea of a large recreation centre at Shell Bay where a caravan and chalet site has been recently started. Further consideration of the recreation potential of the area is included in Chapter 10.

70. The quality of the housing stock in the East Neuk has improved between 1951 and 1961 in line with the national trend. In terms of overcrowding and the possession of basic facilities, Crail and Elie have generally better housing conditions than the other three burghs although the former has a waiting list of 35 and little land available within the burgh. The standard of housing in the landward area is broadly similar to that of other similar areas in the Region and better than the burghs of Anstruther, Pittenweem and St Monance. Again Pittenweem has a waiting list of 40 and has sufficient land to meet that need. Elie appears to have no problems of shortage of accommodation. There are proposals to build sufficient houses in Anstruther to accommodate its waiting list but thereafter there will be no further space for expansion within the Burgh boundary. Taking the five small burghs it is estimated that 1,250 houses will require replacement in the longer-term, 1971 to 2001.

71. Throughout the East Neuk road improvements are needed to eliminate danger spots and to provide by-passes for the burghs and suitable lay-bys for tourists.

Prospects and Policies

72. The present trends of a declining population and of an increasing proportion of the employed population working outside the area seem likely to continue. The area offers, however, an attractive environment to professional and business commuters. There may be a demand for Lundin Links and the Largos to expand as dormitory burghs if economic development continues around Kirkcaldy and Glenrothes and there is a revival of activity in Leven. The residential role of the

easternmost burghs will probably depend more on development in St Andrews, Cupar and Dundee. Lack of housing does not appear to pose any problems although a shortage of building land within the burghs may develop. It is estimated that in the longer-term an additional 3,000 people could be accommodated in the East Neuk.

73. The area is unlikely to attract additional manufacturing employment in any material quantity but some small-scale developments would be desirable and there is some scope for them at Anstruther and St Monance. There are, too, possibilities for the development of the tourist industry. The first suggestion in this respect is that the season should be extended if at all possible. The East Neuk is well-suited as a centre for golfing, sea-angling and car touring, all of which can extend the season. The Fife County proposal for a Scenic Route along the coast would enhance the attraction of the East Neuk, and would open up the possibility for a suitably planned and sited motel. The detailed plan for the area should incorporate particularly the scheme for Shell Bay proposed in the County Tourist Plan and now under construction. This is however a project that should be planned for the long-term with a phased programme of implementation, since substantial promotional costs will be involved. Priority in the allocation of resources should also be given to the conservation and promotion of the attractions which the East Neuk already has to offer. This should bring greater benefits in the immediate future.

74. The particular character and the unique heritage of the East Neuk and its burghs should be regarded as an invaluable asset within the region. The prospect is one of enhancing this character and policies will be required for careful conservation. Plans for conservation areas as defined by the Civic Amenities Act would be appropriate for the burghs and villages as would action taken to implement the proposals in the County Tourist Plan.

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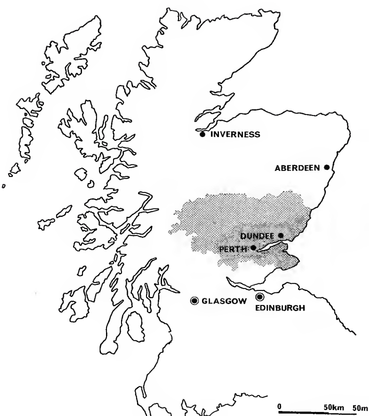
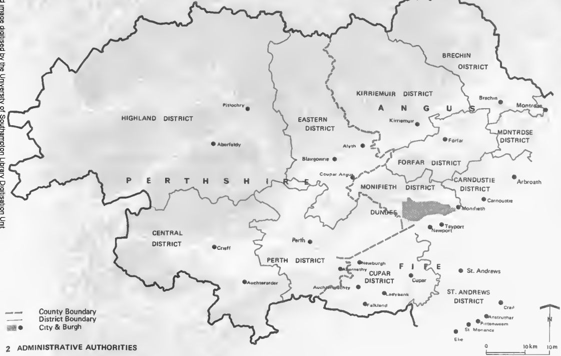
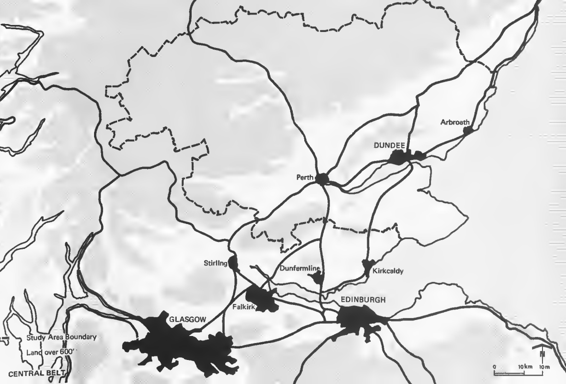
15 AU
1970



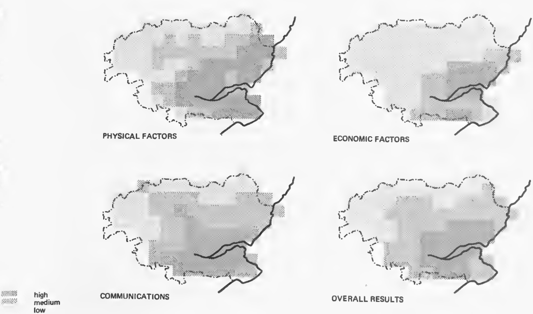
1 TAYSIDE STUDY AREA



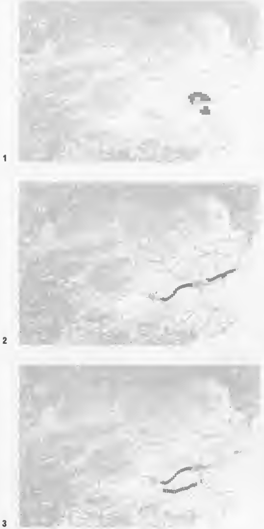
2 ADMINISTRATIVE AUTHORITIES



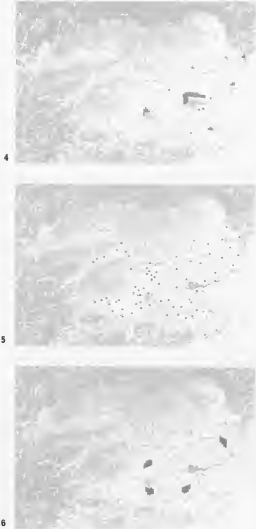
3 CENTRAL BELT



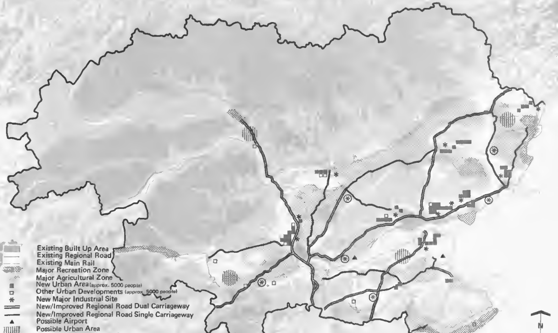
4 INDUSTRIAL POTENTIAL SURVEY



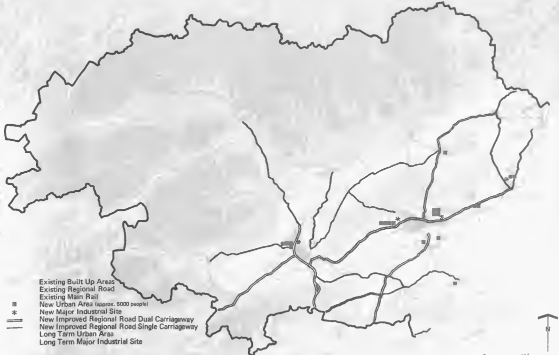
5 INITIAL DISTRIBUTIONS



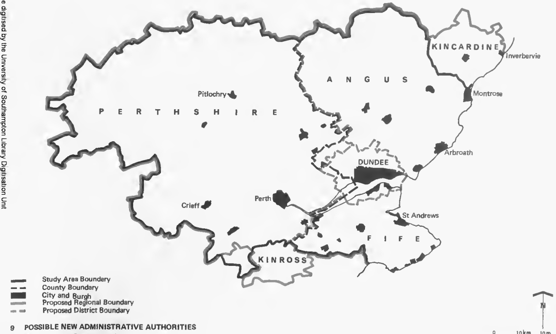
6 INITIAL DISTRIBUTIONS


Existing Built Up Area
Existing Regional Road
Existing Main Rail
Major Recreation Zone
Major Agricultural Zone
New Urban Area (approx. 5000 people)
Other Urban Developments (approx. 5000 people)
New Major Industrial Site
New/Improved Regional Road Dual Carriageway
New/Improved Regional Road Single Carriageway
Possible Airport
Possible Urban Area
Possible Major Industrial Site
N
0
10km
10m

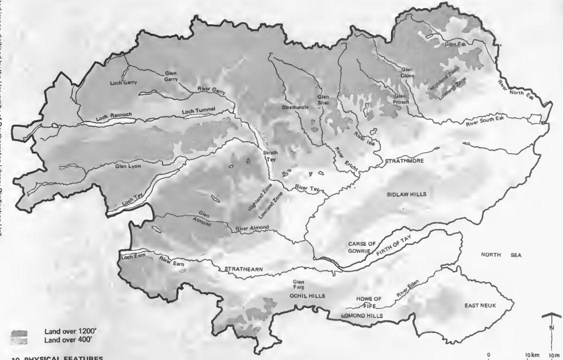
7 LONG TERM DEVELOPMENT POTENTIAL


Existing Built Up Areas
Existing Regional Road
Existing Main Rail
■ New Urban Area (approx. 5000 people)
* New Major Industrial Site
New Improved Regional Road Dual Carriageway
New Improved Regional Road Single Carriageway
Long Term Urban Area
Long Term Major Industrial Site
N
0
10km
10m

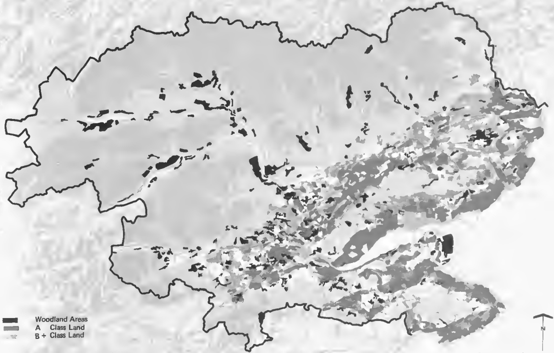
8 FIRST PHASE DEVELOPMENT POTENTIAL



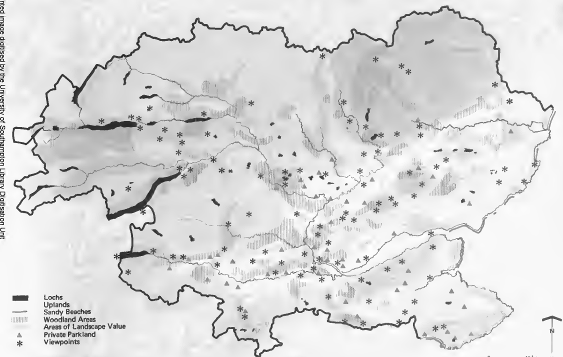
9 POSSIBLE NEW ADMINISTRATIVE AUTHORITIES (WHEATLEY COMMISSION)



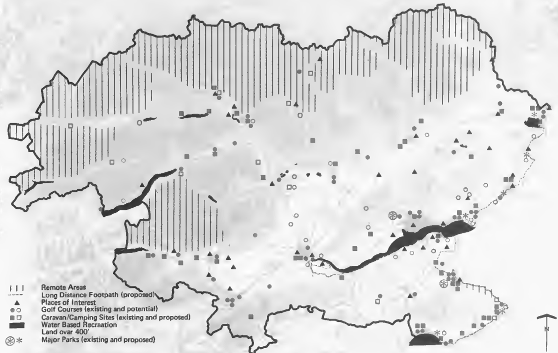
10 PHYSICAL FEATURES



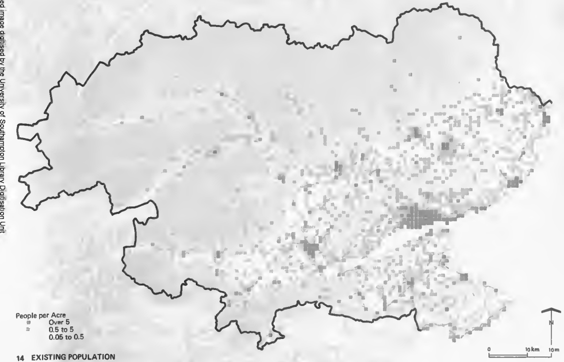
11 AGRICULTURE AND FORESTRY



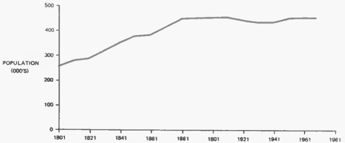
12 RECREATION RESOURCES


Remote Areas
Long Distance Footpath (proposed)
Places of Interest
Golf Courses (existing and potential)
Caravan/Camping Sites (existing and proposed)
Water Based Recreation
Land over 400'
Major Parks (existing and proposed)
N
0
10km
10m

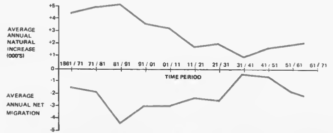
13 RECREATIONAL FACILITIES



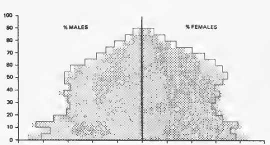
14 EXISTING POPULATION



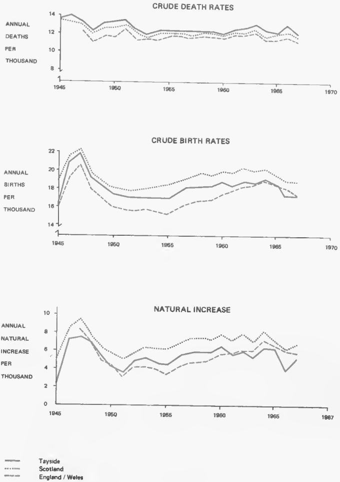
15 POPULATION 1801–1966



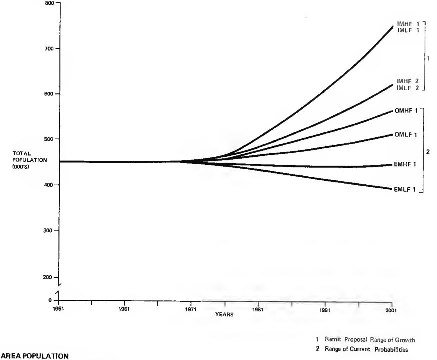
16 NATURAL INCREASE AND NET MIGRATION 1861–1966



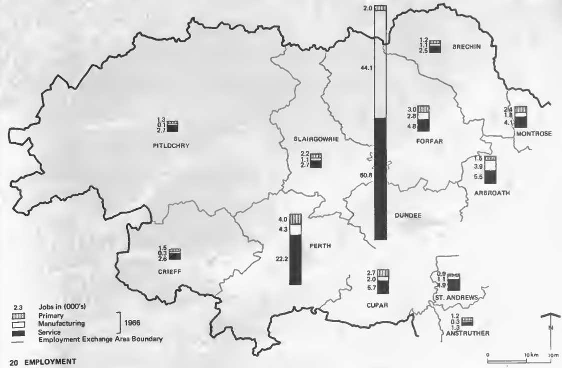
17 AGE/SEX STRUCTURE 1961



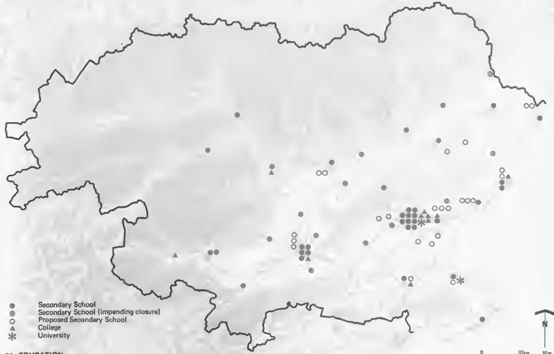
18 NATURAL INCREASE, BIRTH RATES AND DEATH RATES 1945—1967



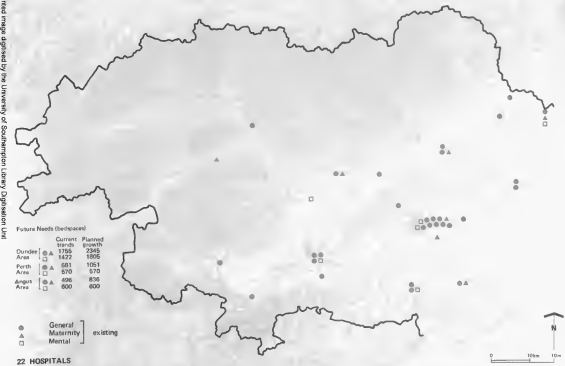
19 STUDY AREA POPULATION
PAST TRENDS AND FUTURE POSSIBILITIES



20 EMPLOYMENT


● Secondary School
◉ Secondary School (impending closure)
○ Proposed Secondary School
▲ College
* University
N
0
10km
10m

21 EDUCATION

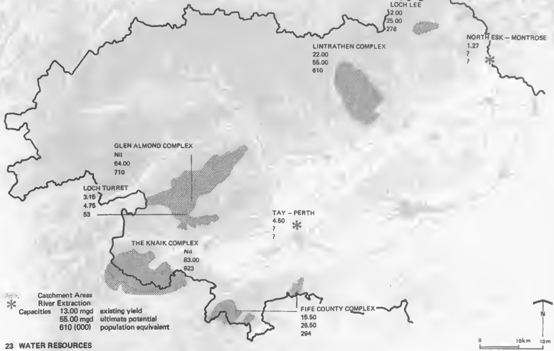


Future Needs (bedspaces)

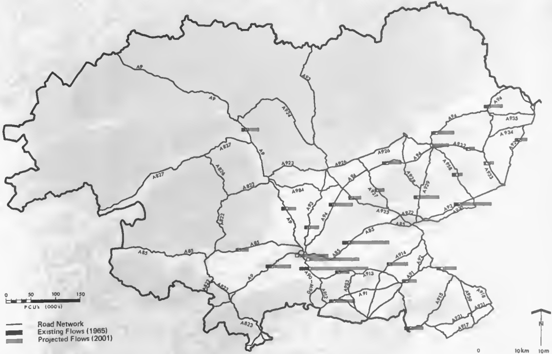
		Current trends	Planned growth
Dundee Area	● ▲	1755	2345
	□	1422	1805
Perth Area	● ▲	681	1051
	□	570	570
Angus Area	● ▲	496	836
	□	600	600

● General ▲ Maternity □ Mental — existing

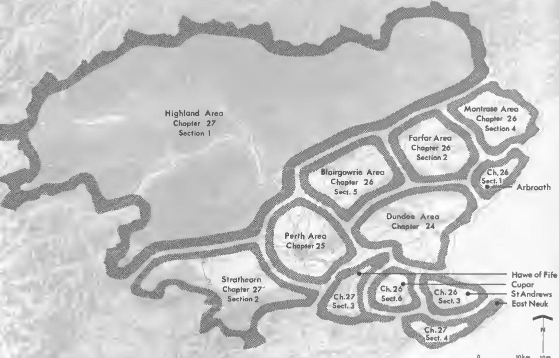
22 HOSPITALS



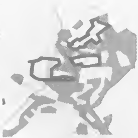
23 WATER RESOURCES



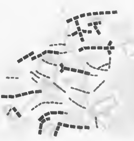
24 TRAFFIC FLOWS



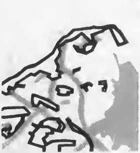
25 AREA STUDIES REFERENCE MAP



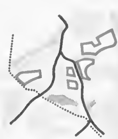
1. PHYSICAL SUITABILITY.
▭ residential
▨ industrial



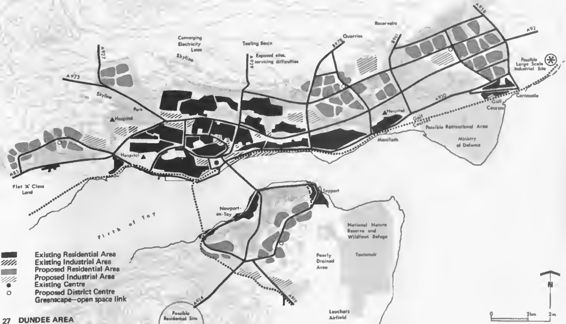
3. LANDSCAPE ANALYSIS
- - - major and minor ridges
▬ woodland
▨ contained areas



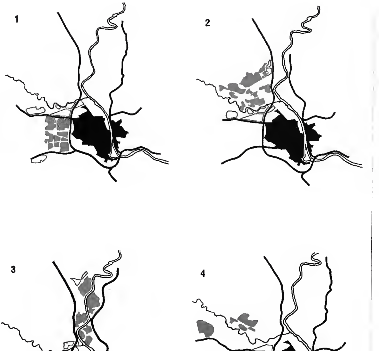
2. RESIDENTIAL RESTRAINTS
▭ significant restraints
▨ modifiable restraints



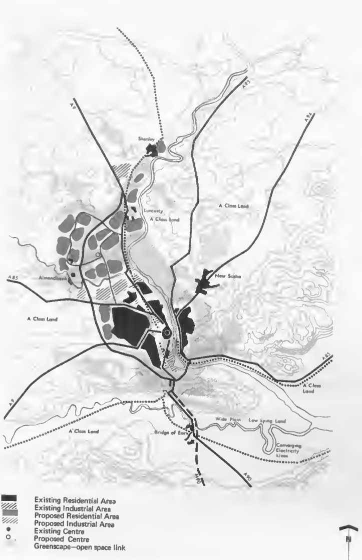
4. DEVELOPMENT OPPORTUNITY
existing urban areas
⋯⋯ main roads and railways
▬ major restraints
landscape barriers
▭ residential opportunities
▨ industrial opportunities



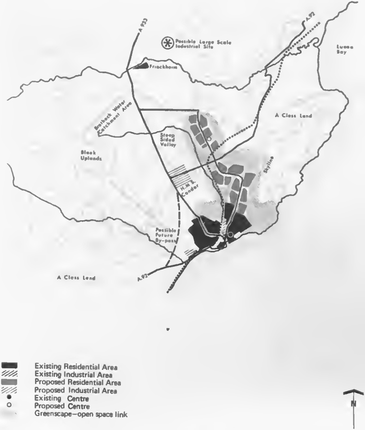
27 DUNDEE AREA



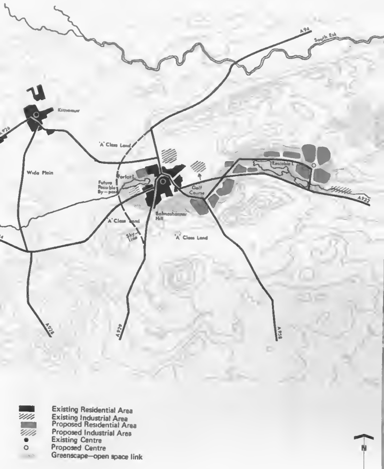
28 PERTH ALTERNATIVES



29 PERTH AREA



30 ARBROATH AREA



31 FORFAR AREA

Plate 1
The Dundee Area from the west
(Planair)

Plate 2 (a)
The Perth Area from the east
(Planair)

Plate 2 (b)
The River Tay north of Perth
(Planair)

Plate 3
Burgh of Arbroath
(Scotsman)

Plate 4
Burgh of Forfar
(Scotsman)

Plate 5
Burgh of St Andrews
(Planair)

Plate 6
Burgh of Montrose
(Planair)

Plate 7
Burgh of Blairgowrie and Rattray
(Scotsman)

Plate 8
Burgh of Cupar
(Scotsman)

Plate 9 (a)
Ounkeld and the River Tay
(Planair)

Plate 9 (b)
Kinloch Rannoch
(Planair)

Plate 10
Burgh of Auchterarder
(Ministry of Defence: Air Force Department)

Plate 11
Burgh of Auchtermuchty
(Ministry of Defence: Air Force Department)

Plate 12
The East Neuk of Fife
(Ministry of Defence Air Force Department)